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GOLD DISK

PageSetter II

The easy-to-learn, simple-to-use desktop publishing program for quickly creating all kinds of great looking documents.

Gold Disk PageSetter II gives you High Quality Low Cost Desktop Publishing For Dot Matrix Printers. Gold Disk PageSetter II will help you quickly and easily produce any kind of document: newsletters, flyers, resumes, ads, brochures, and more.

Full Featured

PageSetter II is easy to learn and simple to use. Import text from any Amiga word processor or type directly onto your page. Use multiple type faces and type sizes. *You can even fill text with user specified patterns.*

Import bitmap graphics from any Amiga IFF paint program and structured graphics from Professional Draw. PageSetter II will automatically convert your graphics into high quality grey scaled images.

Based on Professional Page

Gold Disk PageSetter II is based on Gold Disk's Professional Page - the leading DTP package on the Amiga - and features many of the same powerful capabilities and the same high level of reliability.

High Quality Output

Because PageSetter II uses the same AGFA Compugraphic Outline fonts as Professional Page, you can ouput your pages at the highest resolution of any preference supported printer. This means you get smooth, jaggie-free, text and graphics regardless of the type of printer - dot matrix, inkjet, or laser.

Key Features

Layout:

- Page sizes to 8-1/2" x 14"
- 4 levels of Magnification
- Rulers, grids, columns, margins



Quickly combine text and graphics for dynamic results

Text:

- AGFA Compugraphic Fonts.
- Import text from most Amiga word processors.
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- Bold, Italic, Underline, Outline, Superscript, Subscript, and user definable pattern fills
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AGFA Compugraphic Fonts mean no more jaggies

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- Import any IFF graphic.
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- User definable line weights and fill patterns.

Requires Amiga w/ 1 MByte, 1 Drive

Gold Disk PageSetter II is available for $129.95. Current PageSetter owners can upgrade for $59.95. If you are a registered owner, please call 1-800-387-8192 to upgrade; otherwise, send payment with manual cover or program disk.

Gold Disk Advantage

The Power Spreadsheet You Can Count On

Gold Disk Advantage is the most powerful integrated spreadsheet, database, and business presentation package on the Amiga.

It devastates its competition in every category and offers unprecendented business graphic capabilities.

Feature Comparison	Gold Disk Advantage	Maxi Plan
Max size	65000 x 65000	512 x 32760
# of sheets	Unlimited	3
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Max graph colors	16	8
# of views	Unlimited	No
Sideways Printing	Yes	No
# of funcs	90+	66
ARexx	Yes	No
Performance Comparison		
Redraw	0.87	2.35
Save	2.23	5.33
Load	3.84	6.69
Recalc		
First	2.44	5.15
2nd*	0.19	4.30
2nd**	2.24	4.88
Memory	43216	69832

* With no changes in sheet;** With changes made to sheet
Tests on 1 Mb Amiga; Spreadsheet: 9 rows x 44 columns

Gold Disk Advantage is available for $199.95. If you own any other spreadsheet you can upgrade for only $100. Please send payment along with the cover page of the spreadsheet manual.



GOLD DISK

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•C•O•N•T•E•N•T•S•



"Play it again, Sam...if you've got enough RAM." Music and sound are the high notes this month. As time goes by, the Amiga is becoming a serious sound machine—whether for making music or adding audio oomph to multimedia applications.

FEATURES

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COLUMNS

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GAMES

COVER PHOTOGRAPH BY ED JUDICE
PIANO COURTESY OF HOUSE OF GELINAS

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Before you buy an A2500

READ THIS FIRST!

(or before you even add a hard drive to your A2000)

Upgrade your A2000 to an "A3000 (PLUS 1)" TODAY! With the ~~25Mhz~~ *28 Mhz* 68030, A3001 Upgrade Kit from GVP

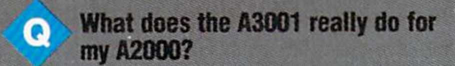


What is the A3001 Upgrade Kit from GVP?

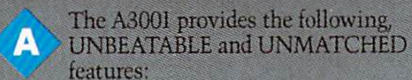


The A3001 Upgrade Kit includes the following:

- 25Mhz 68030 accelerator board for the A2000.
- Factory installed 25Mhz 68882 Floating Point Processor.
- 4 or 8MB of 32-bit wide high performance 80ns NIBBLE MODE DRAM.
- Built-in AUTOBOOTing HIGH PERFORMANCE hard disk controller.
- Quantum 40MB or 80MB hard disk drive with an average read access time of 11ms (19ms on write) and 64KB read-ahead cache. If you already own a hard disk, this item can be optional.



What does the A3001 really do for my A2000?

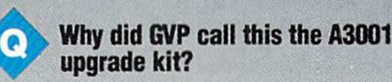


The A3001 provides the following, UNBEATABLE and UNMATCHED features:

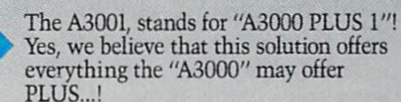
- The world's fastest (and shipping in volume!) accelerator board for the Amiga.® The 68030 CPU includes an on-chip MMU and separate data and instruction caches. According to a recent review in the German "Amiga Magazin," performance is between TWO AND THREE TIMES FASTER THAN THE A2500.
- One of (we are being modest!) the world's fastest hard disk controllers. Measured with "diskperf2," data transfer rates of well over 700KB/sec are achieved. Of course this is not surprising as the hard disk controller is built-in directly on the 32-bit bus of the 68030 accelerator board!
- The up to 8MB of 32-bit wide DRAM is fully DMA-able (can be directly accessed by any DMA device) and is automatically AUTOCONFIGured. The A2500 is limited to only 4MB of (slower) 32-bit wide DRAM.
- GVP's unique DRAM design uses state-of-the-art 80ns NIBBLE MODE DRAMs, which allows full support and advantage to be taken of the 68030's BURST mode. In fact during burst mode, this amazing design manages to achieve an average of ZERO WAITSTATES even at 25Mhz! This DRAM design is similar to that used in Steve Jobs' NeXT® machine, although that design (according to the BYTE magazine review) uses more CPU waitstates at 25Mhz!
- 68000 fallback mode allows the 68030 CPU to be disabled, to ensure full compatibility with timing sensitive applications (e.g.: some game programs).
- Sockets are included for 68030 BOOT EPROMs, allowing future flexibility for running other operating systems.
- GVP's unique ASYNCHRONOUS design means that the 68030 has its own dedicated oscillator and runs completely ASYNCRONOUS to the rest of the A2000. This means better GENLOCK compatibility (not as sensitive to motherboard clock source) as well as providing the ability to run at any clock speed completely independently of the A2000 motherboard, limited only by the access speed of the DRAMs being used.
- For the REAL, math intensive, number-crunching fanatics there is an optional oscillator socket, allowing the 68882 FPU to be independently clocked at even higher speeds (e.g.: 33Mhz).
- ZERO SLOT SOLUTION! With the full-blown configuration installed (25Mhz 68030 & 68882, 8MB of 32-bit wide RAM and one or two AUTOBOOTing 40MB or 80MB hard disks), the A3001 STILL LEAVES ALL THE A2000 EXPANSION SLOTS FREE FOR FUTURE EXPANSION! The only slot in the A2000 which is used is the Co-processor/CPU slot. An equivalently configured A2500 would use an additional TWO valuable expansion slots!

Q This sounds great, but what if I can't afford to buy the full A3001 kit now and all I need urgently is a hard disk drive for my A2000?

A GVP also offers an "a la carte" approach to purchasing the A3001 kit. For example if you are about to purchase a hard disk drive and controller for your A2000, for only a little more you could instead buy the GVP 25Mhz 68030 accelerator board with its built-in AUTOBOOTing hard disk controller and the 40MB hard disk (suggested list price for both is only $1495). You would obviously not get the full performance increase mentioned above, until you added our 32-bit wide RAM daughterboard and the 68882 FPU. However, in this case your initial hard disk outlay is not lost and it can be regarded as a "down payment" on your full-blown 32-bit workstation! If you are working on a REALLY tight budget, call us and ask about our "A2501" upgrade kit for the A2000, which outperforms the A2500 with its 16Mhz 68030! This is also available in "a la carte" form!

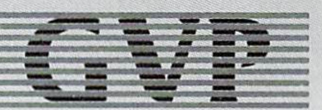


Why did GVP call this the A3001 upgrade kit?



The A3001, stands for "A3000 PLUS 1"! Yes, we believe that this solution offers everything the "A3000" may offer PLUS...!

Why wait, upgrade your A2000 to an A3001 today!



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CHIEF CONCERNS

Tune in or turn off?



USING COMPUTERS TO create and play music is a double-edged sword. Swords are plenty of fun to hack away with, but not much fun when they slice your finger off.

For some musicians and composers, computers are the greatest thing since groupies. They can create artificial orchestras, allowing an individual to compose and play a symphony without knowing how to play any of the instruments. They can help fill in the gaps in an undermanned jam session, and they tremendously ease the highly detailed and tedious work of creating complex compositions.

Most importantly, they allow non-musicians such as myself to make noise, and sometimes even pleasant sounds.

Also, computers in general are reliable. Unlike real musicians, computers don't have cars that break down, hangovers, or appointments to keep elsewhere. They are never distracted by fans, and as long as the power supply is good, they keep a good steady beat. And in the long run they are world's cheaper than a group of skilled musicians. In short, computers are an almost infallible tool that has helped ease the creation and playing of music.

Amigas are particularly good for music, and superbly adept at handling the integration of music, video and animation.

But computers—even Amigas—are not musicians. They have trouble duplicating the raw sound of an acoustic guitar or a set of jazz drums. And it is very difficult for them to be spontaneous.

Like all machines, computers have the nasty habit of throwing people out of work. Rock drummers, particularly studio-based ones, have really suffered from the advent of computer-driven drum machines. Instead of arms flailing, microchips keep careful synchopation. There are fewer mistakes, but that slightly off, unmistakably human sound of a real drummer is missing from studio tracks.

Sometimes computers are a bother in the studio. For musicians who are not computer-oriented, computers can be more annoying than a rock critic. At some jam sessions, the bassist and guitarists simply plug in, and the drummer sets up. Then some technology-driven keyboard player gets the disk drives whirring. After that, the pace is dictated by the computer. "Oops! Wrong file. Hold it." Meanwhile, the real musicians sit idly by while the computer kills the entire spirit of the session.

There is a more insidious side to computers in music. While it is great that computers allow people like me to create sound, it is not great if I force you to listen to it. Computers have created more bad music than anything, except maybe the ukelele. Computers themselves are not pioneers. They cannot do what Beethoven or Miles Davis or Pete Townshend have done, which is create new ways of looking at music, and carry their vision through to its ultimate, human manifestation.

Fortunately with computers, the good usually outweighs the bad. And in music, computers have done many, many great things. No longer do composers sit with pen in hand, carefully forming notes, and then start all over again when they make a mistake. Instead, they can put a piece through its paces, over and over again, until it is correct. Then a laser printer can deliver the score with speed and beauty. The end result is often much better than that created by a tired composer with writer's cramp.

Computer musicians should keep these lessons in mind, and use computers only where they are most appropriate. Professionals and near-professionals should use computers, not abuse them. Sometimes an old-fashioned jam session is the way to go. Budding musicians should experiment as much as they like, but keep the awful sounding results to themselves.

As for me, I'll keep playing with the great music software packages that come through our offices. Because I happen to like my staff, I'll try to keep the door shut. ■

Doug Barr

The Best Keeps Getting Better

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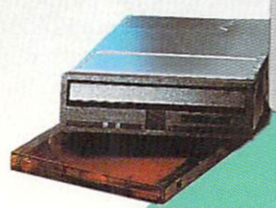
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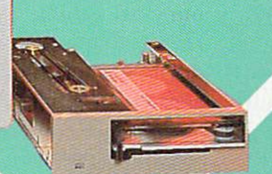
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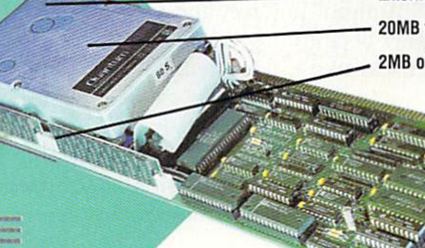


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REPARTEE

Comments, complaints, and concerns

from AmigaWorld *readers.*

CULPRITS? . . .

J. VANDER Brook's letter about the marketing and sales of Amiga products ("Dealing with Dealers," Repartee, Jan. '90, p. 8) was so much on target it's uncanny! He's right. Retail outlets that sell Amigas are not much more than personalized video arcades, where store staff engage in one-on-one sessions on games and in personal, time-consuming consultations on the use of the computer. On the other hand, stores that deal in IBM and/or Apple products seem to take each customer more seriously.

I suspect this is because (after all these years), the Amiga line is *still* not being taken very seriously by the public. It's thought of as just another great game machine. And Commodore's answer to all of this? Running TV commercials with flying houses, and calling the whole issue "creativity."

G. Majewski
Chicago, IL

. . . OR SCAPEGOATS?

HAVING BEEN AN Amiga salesman (and support person) for over two years, I was angered by Mr. Vander Brook's condemnation of the Amiga dealer as the source of poor Amiga sales.

Apple and IBM retailers have the reputation and excellent marketing of their respective companies to bolster the salability (and prices) of their products. Amiga dealers typically have to do their own advertising to stir up business. They must explain why such a wonderful machine is not the leading computer, regardless of its excellent capabilities and low price.

The lower cost of Amiga products result in smaller profits for the Amiga dealer, restricting their resources. That laser printer that Mr. Vander Brook wanted to see in every Amiga store would have cost the Amiga dealer around $4000—money that the dealer could more effectively spend on software and hardware that the typical computer enthusiast would be more likely to buy.

I also take offense to his attacks on the capabilities of dealership staffs. I was proud of everyone who sold and supported the Amiga alongside me, and I did my very best to give my customers what they needed. At the store I worked for, we gave the customer free support for life.

Also, the people who put products on back order are distributors, not dealers. Those matters are completely out of the dealer's control.

I pray that people with this attitude about their Amiga dealer someday go into business for themselves, so that they can see what it is like in the dealer's shoes. Commodore is causing poor Amiga sales, and the dealer is being made into the scapegoat.

Nikola Derpich
Watsonville, CA

IN THE NAME OF SCIENCE

IN HIS NOVEMBER '89 editorial ("Chief Concerns," p. 6), Doug Barney deplores the lack of marketing of the Amiga for applications such as multimedia, desktop video and animation. However, he makes no mention of the use of the Amiga for scientific analysis and presentation of data. In the Repartee and Help Key columns of the same issue, the lack of suitable software for such applications is pointed out, and I think it is for this reason that the Macintosh is capturing much of the expanding market of scientists and science students.

Spreadsheet programs such as MaxiPlan Plus (Intuitive Technologies) and Analyze! (Micro-Systems) will not fit mathematical functions to data and display the fitted curves. Math-Amation (Taurus-Impex) has some of this capability, but lacks the ability to handle hyperbolic and parabolic functions, fit multiple regressions, or carry out analysis of variance.

I cannot recall a single article in *AmigaWorld* that adequately dealt with the subject and critically reviewed available software. If good software does exist for scientific applications, it is certainly not brought to the attention of the customer.

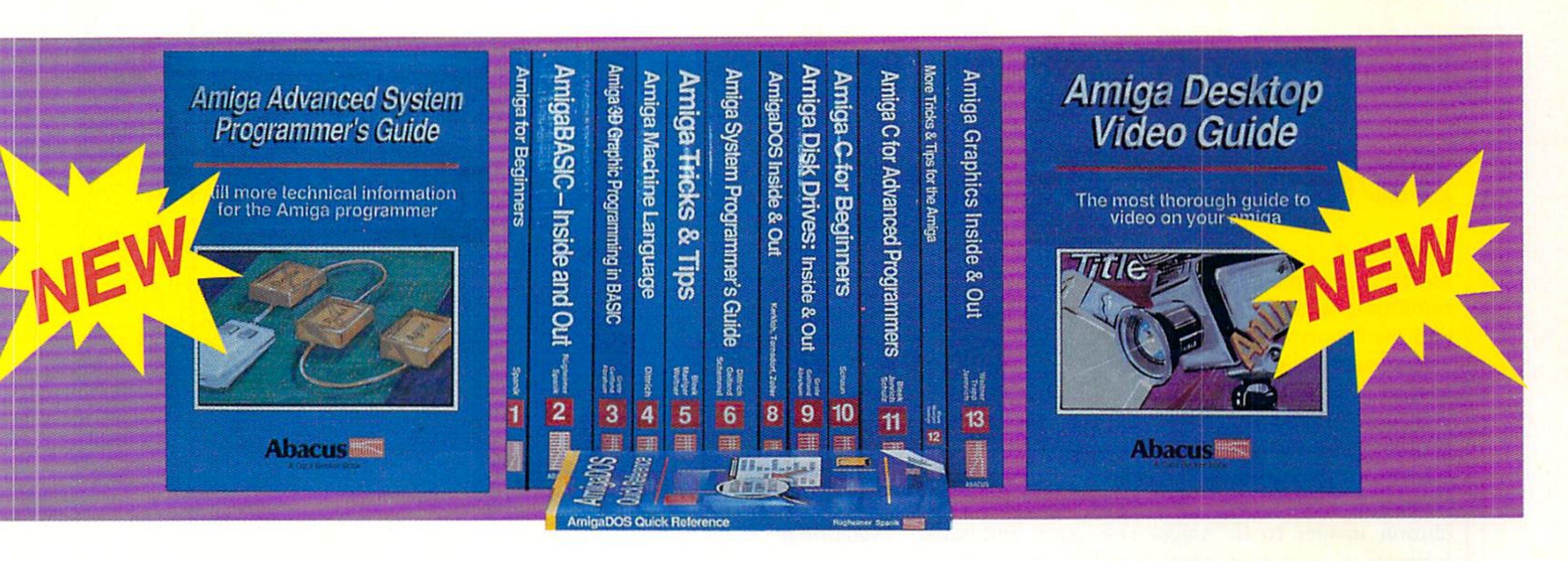
May I suggest you invite scientists using Amigas to comment on software they use or would like to see developed. This might bring to light programs that many people would find valuable and perhaps give guidance to software manufacturers.

K.A. Ferguson
Queanbeyan, NSW, Australia

Send your letters to: Repartee, *AmigaWorld*, Editorial Dept., 80 Elm St., Peterborough, NH 03458. Letters may be edited for space and clarity. ■

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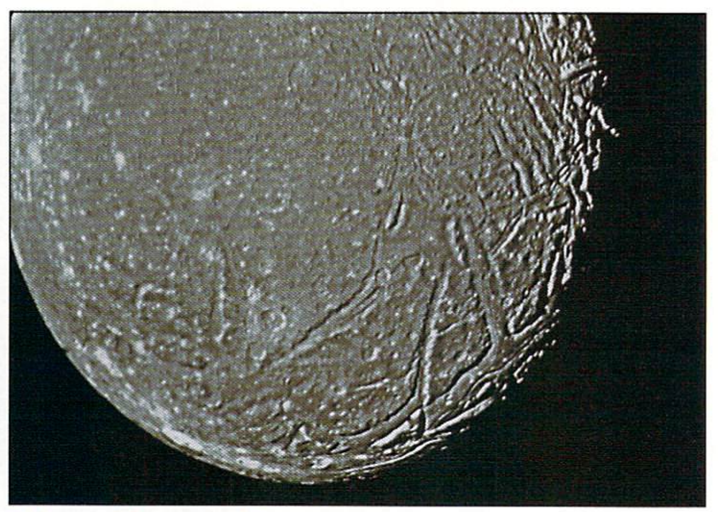
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NOTEPAD

Compiled by Barbara Gefvert Tyson



Ariel, one of the moons of Uranus.

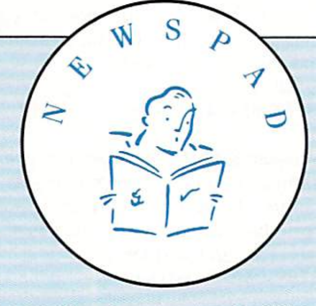
Sweeping Beauty

FOR OVER 12 years, the spacecraft Voyager 2 has trekked through the solar system beaming back clean images of planets in its path, reminding us of the nature of science, the wisdom of uncertainty, and the beauty of diversity.

Recently, Amiga owners have been treated to amazingly high-quality Voyager images on electronic bulletin boards, thanks to imaging specialist Bob Deen of the Jet Propulsion Laboratory in Pasadena, California, command center for the craft's missions. Bob transforms data from JPL's Multimission Image Processing Laboratory into IFF format. He resizes Voyager's 800 × 800-pixel resolution images to fit Amiga resolution and aspect ratio, then converts them to monochrome IFF format, and downloads them to an Amiga. For color, the separate red, green, and blue components are merged using Perfect Vision (SunRize Industries) software into a single HAM image. Bob does not limit himself to Voyager images though; he also converts data sent back by Viking, Landsat, and other craft. Mars, Jupiter, Saturn, Uranus, and even Earth are represented in the gallery.

Last August, before continuing on the long journey to the heliopause and interstellar space, Voyager brushed by Neptune. It will be a short while before the data from that encounter is available for conversion, but in the meantime, Amiga users can find remarkable views of the rest of the solar system and anticipate what the computer eyes of Galileo and the Hubble telescope will bring.

—Joel Hagen



All Over Changes

VETERAN AMIGA USERS and developers have a soft spot in their hearts for Gail Wellington. Long-time head of the Commodore Applications and Technical Support (CATS) group, Gail was recently appointed Director of Special Projects. Knowing Gail, we expect great things.

The new leader of CATS is Jeff R. Scherb, formerly with the mainframe- and minicomputer-database developer Cullinet Software. Jeff brings knowledge of advanced computing architectures, corporate computing, and the ability to manage large, complex development programs. In a recent interview with *AmigaWorld*, he showed great insight into the Amiga's technical shortcomings and enthusiasm and resolve to improve the system.

Soon after accepting his new position, Jeff attended the first meeting of the Commodore-Amiga Developers Advisory Council for North America. The group of nine developers set development priorities, discussed marketing issues, and at times, gave Commodore an earful. Issues brought up at the meeting include programming interfaces, user interface standards, installation procedures, and overall software stability. (The Council is separate from the Amiga Developers Association, founded to broaden the Amiga's visibility and communicate developers' goals to Commodore.)

CBM recently signed with major resellers General Computer Centers, a 13-store chain, and Connecting Point of America, a franchisor with over 325 outlets. Commodore is hoping to capture more of the federal-government and Latin American markets with two new sales offices. Maybe new price cuts—10 to 15 percent on the A2000 series—will help.

To enter the 1990 AmiEXPO art and video contest, send an SASE to: Art Contest Rules and Entry Form, AmiEXPO, 465 Columbus Ave., #285, Valhalla, NY 10595. The five fine arts categories include 2-D, 3-D, digitized, animation video, and mixed media, and there are two groups for commercial art: one for stills and one for tape. Deadline for entry is March 1; winners will be announced and prizes awarded at the AmiEXPO show in Washington, DC, which runs March 16–18. For details, call 1-800-32-AMIGA.

—DB and BGT


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A2630

HURRICANE 2800

IMPACT A3000/4000

Faster, faster, faster!

By Sheldon Leemon

THE FIRST AMIGA speedsters could run programs two or three times as fast as a stock machine by adding a 68020 accelerator board to their systems. Now, there is a group of 68030 accelerator boards that run two to three times as fast as the 020 boards, and up to ten times as fast as an A2000. These screamers, Commodore's A2630, Imtronics' Hurricane 2800, and GVP's Impact A3000 and A4000, provide performance on a par with the fastest of desktop computers.

Each of these boards fits into the Amiga 2000's 86-pin coprocessor slot and increases the computer's performance in a number of ways. For one thing, the 68030 processor can operate at much higher clock speeds than the 68000 (your computer's stock processor) or 68020. The Hurricane 2800 board runs at 28 MHz, twice as fast as the 68020 boards, and four times the speed of the standard A2000 processor, while the Impact board runs at speeds from 25 to 33 MHz. The A2630 normally runs at 25 MHz, but can also run faster.

Like the 68020 processor, the 68030 has a 256-byte instruction cache, which allows short program loops to run entirely within the processor's own memory, eliminating the time required to fetch instructions. In addition, it has a 256-byte data cache, so you can access frequently-used data without taking the time to retrieve it from main computer memory.

Use of the data cache speeds up program execution significantly, but can cause problems with DMA devices, including DMA hard-drive controllers. The problem is that the CPU does not know when DMA devices change the contents of the memory. Thus, if the 68030 has the data at location 100,000 cached, and a DMA device changes the contents of that memory location, the CPU will think that its cached data is valid, and won't read from memory if it needs the data at that location. Although such an occurrence is not very likely, it introduces the possibility of error. All of the boards have hardware protection to keep them from caching data contained in chip RAM, which can be changed by DMA devices like the blitter. But DMA hard-drive owners may want to refrain from turning the data cache on.



I have eight megs of 32-bit RAM on my 25 MHz Impact board and have found it to be very reliable, although I would like to exceed the nine-meg limit. I like the fact that it has a host adapter for running a hard disk. GVP has been supportive.

—***Craig Hollenback***
Cos Cob, CT

The 68030 has a built-in Memory Management Unit (MMU), which you can use to relocate the Kickstart ROMs to fast 32-bit memory, reducing access time to ROM routines. The 68882 floating-point math chip, a coprocessor that is optional on these boards, performs complex math operations at dozens of times the speed of comparable software routines. The majority of programs—word processors, terminals, and games, for instance—never use floating-point math and are not affected by the presence of a 68882. A math chip can speed up applications like CAD packages, spreadsheets, and 3-D graphics, however, from ten to 100 times.

DESIGN SAYS...

Despite their similarities, these boards have important design differences. Like the 68020 accelerator boards, the Hurricane 2800 uses a synchronous design, which means that it can run only at an even multiple of the A2000's 7.1 MHz clock speed (in this case, approximately 28.4 MHz). The A2630 and GVP Impact boards, on the other hand, are asynchronous, and can run at any one of a whole range of frequencies (though Commodore sells just one version of the A2630, running at 25 MHz). Some early versions of the GVP board used 16 MHz 68030 chips, but since faster processors have become cheaper and more readily available, GVP sells versions that run at 25, 28, and even 33 MHz. Changing the operating speed of the board can be as simple as putting in a faster processor and the appropriate oscillator crystal.

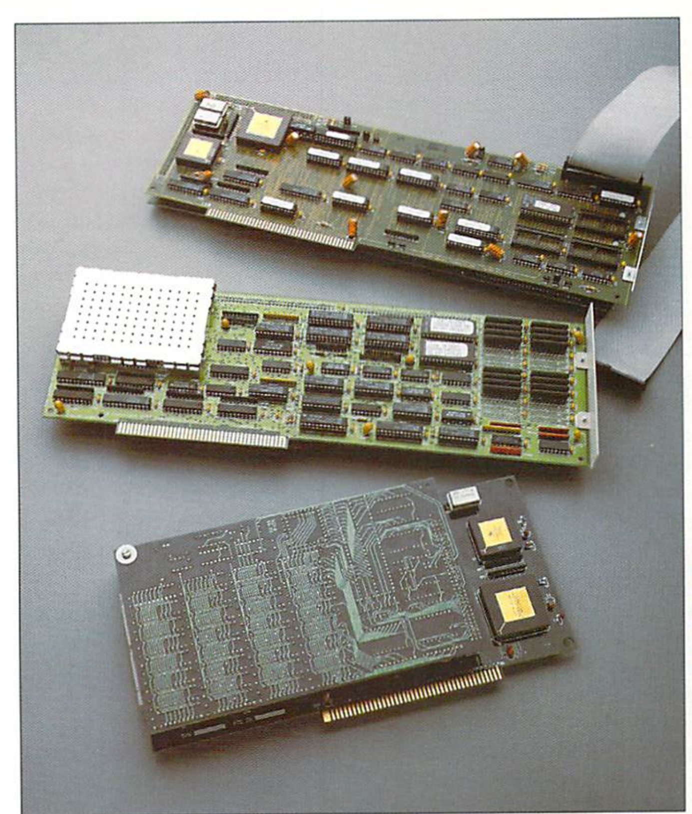
In fact, it is possible to increase the operating speed of the Impact board or A2630 just by changing the clock crystal (the Impact board's crystal is socketed, while the A2630's is soldered in). Running a 68030 processor faster than its rated speed, however, is controversial at

best. Proponents of this practice, called over-oscillation or over-clocking, point out that the speed ratings on chips are only approximate, and that they allow for a fairly wide margin of safety. More conservative types argue that it's necessary to leave yourself a little leeway, because running a chip too fast can cause it to overheat and possibly fail. The possibility of erratic performance is enough to discourage them from pushing the chips. Besides, while increasing clock speed boosts performance, the speed increase is not linear; running a board at 33 MHz won't necessarily make it twice as fast as running it at 16 MHz. The speed at which the processor can access memory is a limiting factor, so unless you have very fast memory chips, you won't get the full benefit of the higher clock rate.

Whether you are for or against over-clocking, you should be aware that the Hurricane 2800 is shipped with a 25 MHz 68030 running at 28 MHz, while GVP uses either a 25 MHz chip running at 25 MHz (the A3000 model) or a 33 MHz chip running at 33 MHz (A4000). (GVP reports that it will be shipping 28 MHz boards in place of the 25 MHz model when the appropriate parts become available.) The A2630 is available only with a 25 MHz processor running at 25 MHz. The Hurricane math coprocessor is clocked at a fixed 28 MHz speed, while the GVP Impact board and the Commodore A2630 can either be clocked at the same speed as the processor, or at a different speed, using a separate clock crystal.

The Drivers' Seat

Both the GVP Impact and Hurricane 2800 boards have built-in hard-drive interfaces, but each takes a different approach. The Hurricane 2800 board features the familiar SCSI interface commonly used to attach up to seven hard drives to the Amiga. I could not evaluate this interface, however, because the driver software was not completed in time for this review. GVP's hard-drive interface, on the other hand, has been up and running for a while. The Impact board includes an AT-style bus interface that allows it to connect with two IDE (Integrated Drive Electronics) hard drives, a style designed for use with IBM AT-compatible computers. GVP offers combination accelerator/hard drive packages that include a Quantum AT hard drive, the same drive used by Commodore in its PC-40 III computers. Boot ROMs that plug into the Impact board enable the computer to auto-boot from the accelerator's hard drive, using the FastFileSystem. The included drive-installation software makes it easy to partition the drive, and to install Workbench on it.



At the starting line are (top to bottom): GVP's Impact A3000, the A2630 from Commodore, and the Imtronics 2800.

> **YOUR TURN!**
>
> I have found the 25 MHz Impact board to be quick and reliable. It is easy to install, and the company has made some nice improvements to it.
>
> —*Charles Bartholomew*
> *Audubon, PA*

Using 32-bit RAM speeds up an accelerator because it eliminates the bottleneck that results when the 68030 processor has to slow down to talk with 16-bit memory (such as chip RAM) and the custom chips. All three accelerators can use 32-bit memory, but only the A2630 provides space for this RAM on the main accelerator board. In order to add memory to either the Hurricane 2800 or the Impact board, you must plug a separate memory board into the main accelerator board. This results in a somewhat bulky two-board sandwich, but gives you a lot more flexibility in configuring the system. With the Hurricane and Impact boards, you can initially purchase the main accelerator board by itself, and add 32-bit memory as your budget permits. The Hurricane 2800 uses the same memory board as previous Hurricane accelerators—one socketed for either ►

one-megabit (256 × 4) or four megabit (1024 × 4) RAM chips. You can add memory in increments of a single megabyte using the smaller chips, or four megabytes using the larger ones, up to a maximum of four or 16 megs respectively. The GVP memory board uses nybble-mode addressing, which allows faster memory access, but requires that memory be added in four-meg increments. The GVP board uses eight-megabit-by-one bit nybble-mode SIMMs (not to be confused with the page-mode SIMMs used in the Macintosh and PS/2 computers) to add either four or eight megabytes of 32-bit RAM.

With the Commodore A2630, your choices are a bit more limited. It comes ►

LET'S GO!

For purposes of comparison, I performed the same speed tests on the 68030 accelerator boards that I used for the 68020 boards (see p. 38 in the July '89 issue). Although some of the programs used in the prior test have been upgraded since then, I used the same program versions so as to maintain comparability. Three categories of tests were performed. The first times applications that do not use floating-point math. The RAM speed tests (Fast RAM/Chip RAM/RAM Speed) on the CSA disk clock instructions executed from fast RAM and chip RAM with the instruction cache turned off. Nsieve comes from CSA, while the other Sieve programs (Sieve/100 and CPU/Memtest) come from Ronin, developers of the Hurricane board. These run variations on a famous program that finds prime numbers, a common test of non-floating-point compute speed. The Search/Replace test shows the time required to perform 800 search-and-replace operations in a 96,000-character text file, using the TxEd text editor by Microsmiths. The Remap test shows how long DeluxePaint II (Electronic Arts) takes to reduce a 640 × 400 picture from 16 colors to two colors. WritePixel clocks the time it takes to fill a rectangle on the screen with color using the ROM Kernel WritePixel function. Finally, Speed is a benchmark recently devised by Jez San to compare the speed of 68030 accelerators with the A2620.

The second class of tests show how 68030 boards can speed operations that use software floating-point routines. The two Savage tests give you the results of a famous floating-point benchmark, as executed by the programs on the CSA and Ronin disks. The MandelTest program comes from the CSA disk, and shows the time required to draw the Mandelbrot set, a graphic that requires calculation of over two million floating-point operations. The Worldmap test shows the time required to draw a map of the world using a set of about 5000 coordinates and an orthographic projection scheme. (This program has a greater ratio of drawing time to figuring time than the MandelTest.)

The third set of tests show how much faster the various floating-point programs executed when written to take advantage of the 68881 math co-processor. Mostly duplicates of the Fast Floating Point tests, these use the 68881 either directly or through the Amiga IEEE math libraries. The final test in this category shows the time to render a 3-D image of the Utah teapot in 320 × 400 HAM mode using the floating-point version of Impulse's Turbo Silver. All accelerators tested used the 68882 math chip running at same speed as the main processor. They all used 32-bit RAM, though the access times of those RAM chips varied (the A2630 was supplied with 100ns RAMs, the Impact board with 80ns chips, and the Hurricane 2800 with 70ns RAMs).

Non Floating-Point Tests		**A2630**	**GVP25**	**GVP28**	**H2800**	**GVP33**
RAMtest Fast	(secs)	2.04	2.08	1.90	1.52	1.58
RAMtest Chip	(secs)	9.52	11.06	10.46	7.91	7.98
RAMspeed	(MHz)	20.39	20.39	20.67	26.72	25.00
CSA Nsieve	(secs)	.27	.27	.23	.23	.20
CSA Nsieve	(gain)	8.61	8.76	10.01	10.79	11.81
CSA WritePixel	(secs)	3.98	3.66	3.34	3.34	3.10
CSA Writepixel	(gain)	3.60	3.90	4.20	4.30	4.60
Ronin Sieve	(secs)	5.70	5.66	5.06	4.76	4.25
Ronin CPU/Memtest	(gain)	10.62	10.62	11.50	12.55	14.53
Search/Replace	(secs)	58.40	57.00	48.20	44.90	46.60
Remap Colors	(secs)	6.00	5.90	5.60	5.60	5.50
Speed	(ticks)	116.00	96.00	85.00	89.00	71.00
Speed	(gain)	2.01	2.43	2.75	2.62	3.29
Fast Floating-Point Tests						
CSA Savage	(secs)	6.30	5.90	5.32	4.94	4.34
CSA Savage	(gain)	8.71	9.27	10.28	11.07	12.60
Ronin Savage/ffp	(secs)	1.53	1.38	1.22	1.20	1.03
Mandeltest 68000	(secs)	53.58	48.48	44.54	42.88	37.74
Worldmap ffp	(secs)	7.90	6.60	6.10	6.10	5.21
68882 Floating-Point tests						
CSA Savage/020	(secs)	.22	.22	.19	.20	.15
Ronin Savage/ieee	(secs)	.43	.42	.38	.38	.30
Ronin Savage/881	(secs)	.22	.22	.19	.18	.15
Mandeltest	(secs)	11.92	11.56	10.40	10.32	9.04
Mandeltest	(gain)	35.40	36.50	40.60	40.90	46.70
Worldmap/ieee	(secs)	5.30	5.30	4.75	4.60	3.70
Worldmap/882	(secs)	2.75	2.45	2.23	2.23	2.05
Silver render	(mins:secs)	61:04	36:38	33:52	39.46	31:26

with two megabytes of 32-bit RAM, and while you can upgrade an A2630 to four megs, doing so is not a simple plug-in operation as with the other boards. Instead, you must solder in 16 RAM chips (256×4 Zips), a job best left to "qualified service personnel." Another drawback to the Commodore board is that it comes with relatively slow 100ns (nanosecond) memory chips. Although the board will run faster with 80ns parts, you cannot take advantage of this feature unless you care to unsolder and replace the standard memory chips. As with the other boards, the A2630 has a connector that provides access to the 32-bit bus, leaving open the possibility of faster memory expansion beyond the four-meg mark.

Welcome to the System

Both the A2630 and Impact memory boards auto-configure—that is, the computer recognizes their memory automatically at startup time, and places it first on the list within its eight-megabyte expansion-memory space. The memory that both of these boards provide can be accessed by DMA devices, which should speed access by such hard-drive controllers. The Hurricane memory board, on the other hand, does not auto-configure, so you must run the Hurricane Configure program to add the memory to the system and to copy the Kickstart ROM code to 32-bit memory. Normally, the memory is added within the eight-meg expansion-memory space, but it can also be configured above this space, allowing you to exceed a total of nine megabytes of memory. Running the Configure program is not much of a burden because you can add it to your startup-sequence; also, it does not need to be run again when you warm boot. The lack of an ability to auto configure has other consequences, however. Unlike the GVP and Commodore accelerators, the Hurricane H2800 does not work with Dave Haynie's SetCPU program, which the other boards use to control the caches, remap Kickstart to fast memory, and to allow the use of a Kickstart disk for booting alternate operating system versions. The Hurricane Configure program performs the first two functions, but does not allow you to start the machine from a Kickstart disk.

Although the 68030 processors in these accelerator boards functionally replace the 68000 processor, it is possible to temporarily disable the 68030 and use the 68000 for running that rare piece of software (copy-protected games, for the most part) that will not work with the 030. In the case of both the Impact and Hurricane units, this is accomplished by means of a hardware switch you must buy and attach to a pair of jumper pins on the board. With the switch in one position, the computer boots using the 68000 processor; in the other position, it uses the 68030. Commodore's A2630 board uses a more sophisticated approach: If you hold down both mouse buttons at boot time, a menu appears letting you choose AmigaDOS on 68000, AmigaDOS on 68030, or Amix (the Amiga version of Unix). Despite the fact ►

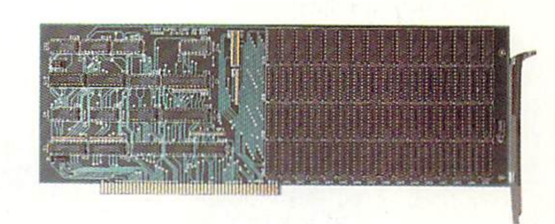
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that GVP does not support this selection mechanism, the company claims that with the right boot ROMs, its board will allow software selection of Unix.

Turning off the 68030 board restores full software compatibility, but also disables everything attached to the board. This means that neither the 32-bit memory nor the 68882 coprocessor is accessible when in 68000 mode. Likewise, GVP's hard-disk interface does not work when the 68030 is turned off. Imtronics, however, claims that its SCSI hard-drive interface will continue to operate in 68000 mode.

How Fast Is Fast?

The speed increase realized with these boards depends on the application, though there will be a marked boost in any application. Floating-point math aside, these boards perform most operations at five to nine times the speed of an unaccelerated Amiga. Speed increase will be most noticeable in applications that are normally slow, such as desktop publishing and CAD, and in multitasking situations, where the machine tends to bog down. An 030 with Kickstart in 32-bit memory makes a big difference in the time it takes to redraw windows in almost any application.

The performance tests I conducted came down, as expected, in favor of the boards with the fastest clock speeds and the fastest memory. At the 25 MHz clock speed, the GVP Impact board using 80ns RAMs was faster than the Commodore A2630 which uses 100ns RAMs. At 28 MHz, the Hurricane 2800 with 70ns RAMs was marginally faster than the GVP with 80ns RAMs. But at 33 MHz, the GVP Impact board was clearly the fastest of the systems tested.

The same factors that made the Commodore A2620 a favorite among 68020 accelerators work to the disadvantage of the A2630. Selling just one configuration of the board makes sense when it runs at a fixed processor speed, but not when the board uses an asynchronous design. And the fact that the board comes only with relatively slow 100ns RAMs is not going to please the performance minded, either. Although the tests show the A2630 to be a bit slower than the other boards in most categories, it did particularly badly in the ray-trace test, in which the 68020 version of Turbo Silver (Impulse) was used to render the Utah teapot. While most other boards rendered the picture in about half the time required by the A2620, the A2630 was only about 15% faster than its predecessor. Unless you are willing to replace the processor and the memory with faster versions, the A2630 is not your best choice if speed is your primary concern. Its low price and the Commodore label are its best selling points.

Like its 68020 counterpart, the Hurricane 2800 gives you a lot for your money. For about the same price as the A2630, it provides faster performance, easier memory expansion, and a SCSI interface to boot. There are, however, factors that might make you think twice about its purchase. Because the SCSI interface is not yet operational, there is no clear indication how it will perform. The

Continued on p. 80



Now Hear This!

Good 'sound' advice in eight easy-to-master techniques for making better sound samples to use in any Amiga production you may have in mind.

By Mitch Wells

Unless you are a musician, you might forget the many ways that sound figures into all the things you can do with your Amiga. So consider for just a moment: voiceovers and narrations for business or professional presentations; sound tracks for home video productions; sound effects for animation sequences; musical accompaniment for slide shows; or just some wild sound show of music, voices, and off-the-wall effects of your own design. The list of possibilities is endless.

Effectively using the sound-sampling capabilities of your Amiga is the key to doing any or all of these things. And the following hints and tips will make you a better Amiga audio producer, musical director, sound technician—or whatever other role you need to play.

You can use the Amiga to produce sound in three ways: through its built-in speech synthesizer, by modifying the registers in its sound chip, or in sampling with the help of digitizing hardware and software. The first, and most primitive method, is known to those of you who plowed through the introductory manuals. The second, and probably least useful, is something for the technical aficionado who is at home programming a professional synthesizer. Although there are a few good programs that can help you out here—notably, Sonix (Oxxi, $79.95) and Synthia (The Other Guys, $99)—creating original sounds can be tedious. Sampling, however, with its entire range of real-world sound and music at ready disposal, is clearly the easiest route and has the most widespread application.

Sampling, simply, is the process of converting ordinary, analog sounds into digital information (through the sampling hardware's analog-to-digital converter, or ADC) to be stored in the Amiga's memory. This information is then reconverted into analog sound waves, through one of four digital-to-analog converters (DACs) within the system's Paula chip, a stereo preamplifier also found within the Amiga, and your sound system (or the amplifier within your monitor). In order to make samples yourself, what you need is some external sampling hardware (sound digitizer), sampling software, and something to sample.

As for the hardware and software, there are a number of fairly inexpensive packages to choose from. Hardware (digitizer)-and-software (sample editing program) combinations include Perfect Sound (SunRize, $89.95); A.M.A.S. (Microdeal / MichTron, $169.95); Stereo Sound Sampler+Jammer (Datel, $99.95); and SP8 (Creative Sound Systems, $100). If you already have the digitizer, you can purchase sample-editing software separately; AudioMaster II (Oxxi, $59.95) and Studio Magic (SunRize, $99.99) are two that readily come to mind. For the purposes ►

ILLUSTRATED BY MARY LYNN BIASUTTA



of this article I will refer to a system consisting of Perfect Sound hardware and AudioMaster II software. Although Perfect Sound can be a bit noisy, I like AudioMaster II. The two complement each other well.

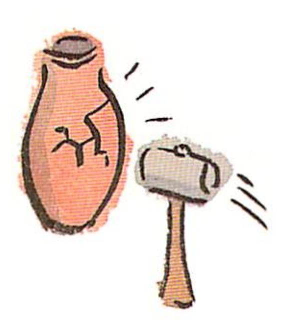
Don't worry, however, if this particular duo is not your own setup, because the techniques and tips I will discuss will apply to just about any combination. (For comparative evaluations of the sampling hardware and software products mentioned above—and for a compatibility chart to guide you in mixing and matching components—see "Sizzling Sounds," p. 48 in Oct. '89 issue.)

1 Is This on the Level?

Preparing for sampling can be as important, if not more important, than actually taking the sample.

To get the best results, preparing for sampling can be as important, if not more important, than actually taking the sample. Although some sampling hardware will give you a choice between input types, most sampling hardware requires that the sound come from a "line-level" source. Line-level devices include CD players, cassette or reel-to-reel tape recorders, audio outputs from videotape, an AM/FM receiver, a keyboard, or a "live" source recorded with a microphone and a mixer. Trying to sample from a headphone or speaker output, when the hardware requires line level, will usually cause distortion. Sampling from a microphone without a preamplifier (or mixer) will create large amounts of noise. In short, use the right hardware.

2 'Sound' Shopping Advice



Deciding what to sample is obviously the next step. Perhaps you know a section of a pop song or classical piece that would work great at the beginning of your animation, or maybe you recorded voice onto cassette for a narrative. If you have a CD player, there are a number of professional sound and sound effects libraries available. A favorite with many professional musicians is the ProSonus Sample Library. You can find similar offerings among the numerous cassette libraries advertised in the classifieds of most keyboard magazines. Also, many record stores and public libraries carry sound-effects records.

Whatever your source material, choosing the best sounds for sampling should meet the following criteria:



The sound should be easily isolated. If you choose a section of music or narration from a tape or CD, silence before or after the sound is preferable. Background noise, especially noticeable from cassettes, is not. CD players offer the advantage of allowing you to accurately pause and play small sections of a CD without having to get "up to speed" and leaving you with that annoying click or glitch usually accompanying such transitions.

The sound should have an "even" dynamic range. Sounds that get loud and then soft (or vice versa), or have a long decay (as you would get by holding down a piano key), are not as desirable as sounds with a quick decay (like the beep of a car horn), or those with an even volume level.

The sound should not be distorted, but it should be a good, strong level. This is especially important when working with cassettes. When recording or choosing a sound on cassette to be sampled later, the sound should be at or around 0 vu on the meter. Having a volume control at the source of the sample (as with a keyboard or a cassette player with an output knob) will help you match levels to overcome "sampler noise" (more about this later).

The sound should be the best fidelity possible. Again, CDs have obvious advantages here. For creating your own sounds from scratch, however, a good microphone and mixer beats a cassette recorder any day. If you do not already own a microphone and mixer, don't waste your money on the cheap ones made for home video recording. If you are interested in acquiring a good mic and mixer for a one-time sampling session, contact the music and A/V rental stores in your area. The occasional rental will probably not break your bank account, and you will enjoy all the benefits of using superior quality equipment.

3 Thanks for the Memory...

Before you actually make your sample, there is still another consideration: memory. How much, and what kind of memory you have relates directly to how high a level of fidelity you can achieve, so decide how you are going to use the sample first. If you plan to use your sounds in Sonix (Oxxi), Deluxe Music Construction Set–DMCS (Electronic Arts, $99.95), or with a sequencing program such as KCS (Dr. T's Music Software, $249) or Dynamic Studio (New Wave, $199.95), you will probably want the highest fidelity possible. Most sample players use chip memory; if you have more available, your sample can be longer and of higher fidelity. Installing a one-meg Agnus chip on machines with one megabyte or more will be a great help when working with longer samples. (You may already have the new one-meg Agnus chip in your A2000 if it was purchased after September 1989—type AVAIL in a CLI window to see how much chip memory your machine has available.)

How much memory you have also may determine the *sampling rate* at which you will take your sample. (The sampling rate denotes how many times per second the computer takes the "picture" of your sound.) The more samples an ADC takes per second, the more accurately it will record the sound (hence the higher resolution—and greater fidelity—when that sound is played back). The Amiga's maximum

playback rate, however, is 28,867 samples per second (sps), so it does not really matter if your digitizer can sample at higher rates. Also, when sampling in stereo, the sampling rate is automatically cut in half, from 28k to 14k. Fortunately, most people do not hear sounds beyond 15k.

Thus, if you are going to use your sample with something memory-intensive like an animation, consider sampling at a lower sampling rate to conserve memory. A sound sampled at 28,000 sps will take less memory than the same sound sampled at 44,000 sps; sampling the sound at 16,000 sps will take even less memory. The fidelity ceiling (calculated at half the sampling rate) of the sound sampled at 28k will be 14k, while that of the sound sampled at 16k will be 8k—which might be okay for some applications.

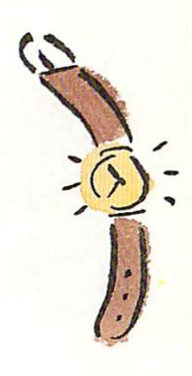
You will have to decide your own level of acceptable trade-off for fidelity vs. memory constraints, but, in general, sampling at lower rates is usually a good, practical idea for capturing long passages of sound and music if you have a system with limited memory.

4 The Great Equalizer

No matter what sampling rate you decide on, there are a few tricks that can provide you with better results. One of the most effective is equalization. Equalizing (or EQing) a sound involves running a line-level sound through a series of filters, usually called high-pass/low-pass, band-pass, or parametric filters. These filters emphasize or de-emphasize certain frequency bands—hence the names. Hi-pass/low-pass is most commonly found at the bass and treble controls in stereo systems. Using your stereo system for EQing would be fine if you could sample from the speaker outputs, but, as mentioned earlier, most sampling hardware will not allow this. Unfortunately, using the bass and treble controls on most stereos does not affect the line outputs (the tape monitor output, for instance). Thus, you need an in-line EQ that can be put after your source device but before the sampling hardware.

The most common type of in-line EQ is the 10-band Graphic Equalizer available almost anywhere stereo equipment is sold. Radio Shack makes a 10-band Graphic EQ for under $80, while Teac offers a 10-band with an LED frequency analyzer (to show which frequencies are the loudest) for not much more. Many others sell for around $100; if you plan to do much sampling, owning one of these is a must.

Don't go overboard when using a graphic EQ. The proper use of any EQ is to correct aural deficiencies. EQing for a cassette source often involves just slightly de-emphasizing frequencies above 12k to reduce tape noise, while emphasizing 8–12k to make up for the reduced highs associated with cassettes. EQing a live voice might mean emphasizing high frequencies a small amount to increase sibilance, and cutting down on the very low end to decrease pops from P's and B's. With instruments, many have specific mid-range frequencies that make them sound somewhat nasal, so here you might want to use EQing to reduce these. In the back of some music theory or audio engineering textbooks, and in the manuals of all graphic equalizers, you will usually find a chart showing the frequency ranges of various instruments and voices. These are very good sources to have around for reference.

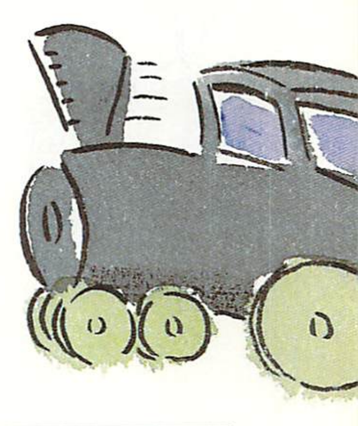


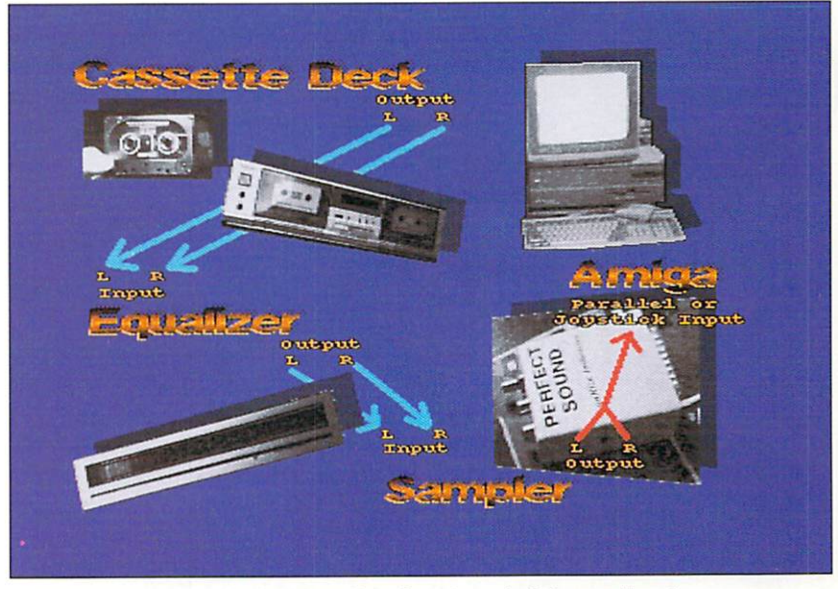
5 High-Speed Fidelity

Another way to increase the *perceived* fidelity ceiling is to speed up the sample. Speeding up the sample also reduces the likelihood that you will notice "D to A noise" (a fuzziness usually heard in the high frequency range of a sample). This noise is distortion created by Digital-to-Analog converter errors when the DAC reads in-between steps of a sample; it is present in all samplers. When a sampler takes "pictures" of a sound (digitizing), it takes a number of pictures (or samples) to make up the complete waveform. In 12- and 16-bit samples, there are more discrete steps to the sample, so fewer errors occur than with an 8-bit sample.



Recognizing that this distortion is a problem, Commodore put low-pass filters in all Amigas. While the filter reduces the distortion, it does so at the price of eliminating frequencies above 7.5k. Thus, in many situations you need to bypass the output filter. While you cannot do this on the A1000 without a hardware modification, the filter is software switchable on the A500 and A2000. With the public-domain program LED (found on the Sonix 2.0 disk and on many ►





A standard setup for line-level sampling: from tape deck to equalizer to sampler to Amiga.

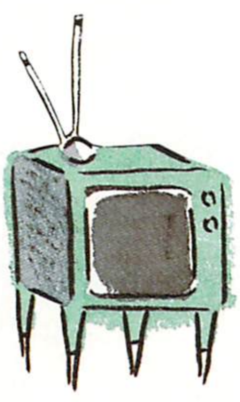


networks), for instance, you can turn the filter off the latter two models.

Once the filter is disabled, of course, you have your distortion problem again. If you speed up the sample, however, not only do you raise the frequency (pitch) of the sample, but you also elevate the frequency of the noise as well. With a sample that was made at 28k and moved up an octave, most of the D-to-A noise will probably occur out of human hearing range! Your sample, however, will play back twice as fast—which probably is not exactly what you wanted.

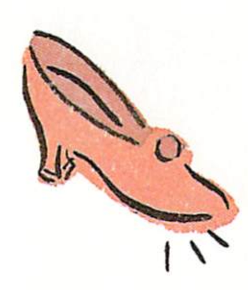


One way to get around this is to get a fairly high-quality dual-speed tape deck. Most consumer reel-to-reel decks, such as those made by Sony, Panasonic, or Teac, offer two speeds; if expense is a problem, you might be surprised how often you can find these at many second-hand stores. In addition, there are several four-track cassette recorders, such as the Yamaha MT3X or the Tascam 644, that offer dual-speed operation. Also, in the back of some music magazines you will see dual-speed cassette decks advertised for guitarists wanting to learn licks from their favorite tapes. Many old turntables offer dual (or more) speeds, too.



In whatever way you get your equipment, the trick here is to record your desired sound onto tape at high speed, then sample the sound while playing back the tape at low speed (which is almost always an octave jump). Finally, kick the sample up an octave with your sample-editing software. When using Audiomaster II, choose Tune Waveform from the Special Effects menu. Click once on the Octave slider to the right of the indicating bar. Now click on the Waveform gadget in the bottom half of the screen to hear your changes. Finally, click on OK within the Tune Waveform window to accept the octave jump.

Be prepared, however, because this eats up a lot of memory and is usually best done with short samples. Sampling in stereo eats up even more memory, so if you sample is stereo, be sure you really need stereo. Many programs, such as Dr. T's KCS, for example, do not support stereo samples.



6 Got the Signal?

After you have decided the rate at which you will sample, and you have set up your EQ, making the sample is pretty straightforward. Have your software "listen" to your sampler before actually starting your sound. This way, you can see how much noise (if any) is being introduced by the sampling hardware. Perfect Sound, for instance, is quite noisy. In order to get a good sample with it, I first adjust the input control to find the point at which there is the least noise, but the most input signal. I need to make sure my input signal to the sampling hardware is pretty "hot"—almost but not quite *clipping*. Clipping is distortion caused by the input signal level being too great for either the sampler to handle, or the source device (or tape itself) to put out (or record) properly. On Audiomaster II, it is easy to tell when the signal clips; the waveform displayed will break up. Once the signal seems right, try making a few samples. Save your work often, and sample and save different versions of the same sounds for comparison. Experiment and have fun!



7 Sampling Savers

Most programs use the IFF format, so saving your samples to IFF files is the safest bet. If you want to make an entire soundtrack from IFF samples, Sonix can take these and use them as segments of a song rather than instruments. Compose a complete song by sampling entire bars of music that can repeat, and assign these samples to any of the four instruments. The instruments can then be thought of as verse, chorus, and so on. Simply compose with whole notes and rests. When using Dr. T's KCS, you can assign up to 16 samples to specific MIDI channels and keyboard ranges. Allocating four sounds to four note ranges and one MIDI channel will create some formidable keyboard splits.

8 Let's Get Looped!

If your samples are going to repeat after they are played out once, you will need to tell your editing software where to begin to repeat a loop. Something to remember about making loops is that an instrument gets it perceived characteristics from the first few milliseconds of attack. Even for complex instruments and sounds, the loop does not have to be long, although the initial attack might have to be. AudioMaster II offers two features to help you make the best loops possible: Seek Zero and Seek Loop. These look for the quietest points in a sample (zero meaning no volume) to set repeat points in a loop. Seeking zero points helps to avoid clicks in loop repeats. Such clicks are simply jumps in both volume and waveform composition. When making a loop, I frequently move the beginning and ending loop pointers manually to make my loop as short as possible, while still retaining the characteristics of the sound. I then use the Seek Zero function to find the best repeating point in the vicinity of the loop pointers. Looping the sample merely requires a little experimenting. Thus, saving different versions of your sample with different loop points is a crucial element in making the best sample. ■

Mitch Wells runs an audio-recording, video-production, and desktop-publishing service in Michigan. He has worked in a number of recording studios, both as an engineer and a session musician. He has also taught classes in MIDI and other aspects of computer-assisted music production. Write to him c/o AmigaWorld, *Editorial Dept., 80 Elm St., Peterborough, NH 03458.*

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Denmark
+45 1 474614

Datel Computers
3430 E. Tropicana #67
Las Vegas, NV 89121
702/454-7700
800/782-9110

Dr. T's Music Software
220 Boylston St.
Suite 206
Chestnut Hill, MA 02167
617/244-6954

Electronic Arts
1820 Gateway Dr.
San Mateo, CA 94404
414/571-7171

Microdeal
distributed by MichTron
576 S. Telegraph
Pontiac, MI 48053
313/334-5700
After April 1,1990:
3825 Lapeer Rd. W.
Auburn Hills, MI 48075
313/377-8998

New Wave Software
PO Box 438
St. Clair Shores, MI 48080
313/771-4465

Oxxi Inc.
PO Box 90309
Long Beach, CA 90809
213/427-1227

ProSonus
1616 Vista Del Mar
Hollywood, CA 90028
213/463-6191

SunRize Industries
PO Box 1453
College Station, TX 77841
409/846-1311

Teac/Tascam
7733 Telegraph Rd.
Montebello, CA 90604
213/726-0303

The Other Guys
PO Box H
Logan, UT 84321
801/753-7620
800/942-9402

Yamaha Music Corp.
PO Box 6600
Buena Park, CA 90622
714/522-9011





Patchwork

Compared to squinting at your synth's LCD readout, these editor/librarians make editing MIDI patches easier, but still not perfect.



SYNTHESIZERS USED TO look like something out of an old Buck Rogers movie. Rows of knobs, dials, sliders, and buttons covered a panel attached to a piano-like keyboard. Programming the synth required you to set every control at the right level to create a "patch" that produced a sound. These early analog synths had no memory, so getting another sound required resetting each control, a time-consuming and inexact process.

Today's electronic instruments give you more control—but at a price. Their internal software lets you program multiple sounds (patches), store them in the synthesizer's memory, then recall them at a touch. Gone, however, is the array of controls that served as a map of every parameter's setting and how they interrelated. Modern synthesizers offer sometimes as few as four programming buttons with which you can change functions. You base your decisions on the readout from one (typically tiny) LCD screen, which shows a single setting at a time. Often you must scroll through dozens of cryptic numeric parameters to find the one you want. Programming with the LCD-screen interface is tedious, unintuitive, and frustrating.

The alternative is software that lets you use the Amiga's power to edit the synth's settings. The field of Amiga synth editors is dominated by two companies: Sound Quest and Dr. T's Music Software, each of whom make editor/librarians for over 25 instruments. In addition, a number of small companies offer programs for individual synths. (See the accompanying chart for a complete list of supported synthesizers.) Prices range from $35 to $195, averaging around $150.

The ideal editor should speed and ease editing by using a screen that gives an at-a-glance map, as did the old-fashioned hardware controls, displaying an overview of all parameters while letting you focus on a particular control or group of controls. It would use the precision inherent in alphanumerics to augment, not replace, these graphic icons. With it you should be able to move easily from parameter to parameter as you set up a patch and see how the various settings interact, much as the Sound Quest editor ►

By Tim Tully



ILLUSTRATED BY LARRY McENTIRE

for the Roland D-50 does (Figure 1). Unlike the D-50 editor, however, the perfect program should let you play your synth, just as you would in a real situation, then continue editing the patch until you have a sound you like. The program would also let you edit a synth's characteristic features, such as layering of sounds and MIDI SysEx settings. A good editor would include a librarian for storing sounds in banks matching the configuration of the synth's memory, and let you load these banks without undue fuss, so you can get back to the music.

DISCORD IN PARADISE

Be warned: Amiga editor/librarians are not ideal. Their user interfaces have serious limitations, and

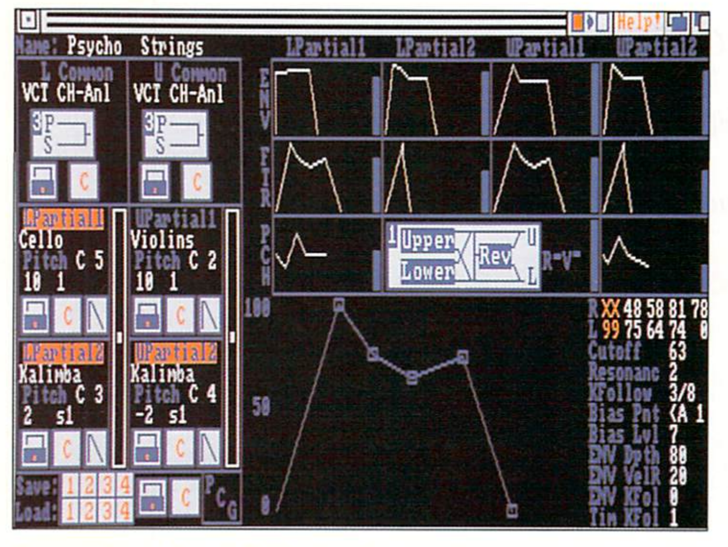


Figure 1. Sound Quest's D-50 editor displays all the instrument's interrelated parameters on one screen. Three subscreens covering more global functions can be displayed in the large square in the lower right, leaving the other parameters visible.

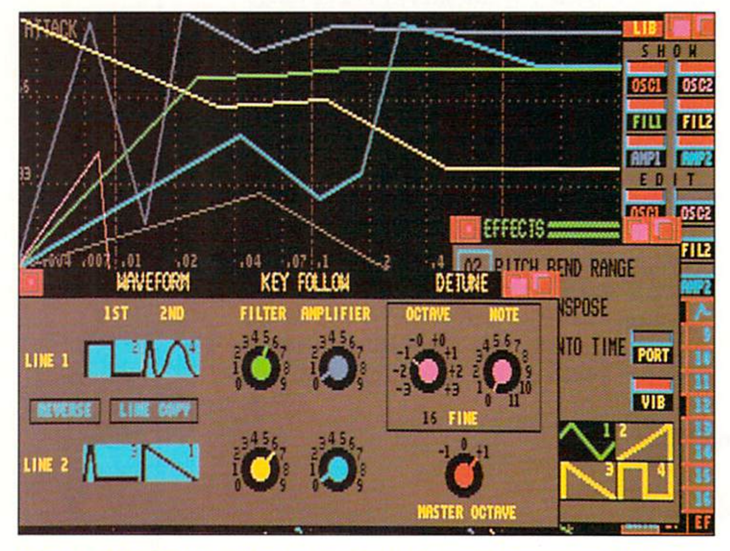


Figure 2. The C-ZAR editor for the Casio CZ series makes excellent use of editable graphic icons to display the status of parameters and allow coherent editing.

the documentation is atrocious across the board. Most librarian functions are handled straightforwardly and simply, but the editors enhance personal productivity only because the alternative—LCD-screen programming—is such a struggle.

Consider, for example, the ubiquitous Yamaha TX81Z FM synthesizer. At its basic level, this instrument contains 32 editable patches to which a TX81Z editor must devote a screen. On a higher level, the TX81Z has configurations called "performances," in which you can assign up to eight patches to play together on any one key. In addition to a patch-editing screen, a TX81Z editor needs a separate screen that facilitates editing a performance and shows the relationships between a performance and the individual patches you can load into it. These needs are only partially addressed by Dr. T's and Sound Quest's programs.

Although both programs extensively use alphanumerics to communicate parameter values, their patch-editing screens make only fair use of graphic tools. The programs do use graphics effectively in the display and editing of the instrument's complex envelopes. With Dr. T's there is a further nice graphic touch in the "virtual slider," found at the left of the screen, with which you can adjust any parameter: Highlight the parameter's value, then click and drag on any blank point of the screen.

Editing a TX81Z performance is another matter. You must juggle a performance's structure, selecting and placing up to eight patches and occasionally tweaking a patch. Quick recognition of individual values and the ability to see an overview are paramount, but both programs' performance editors drop the ball. Aside from the Doctor's virtual slider and Sound Quest's turning altered values orange, no graphic communication occurs. Relative volumes—prime candidates for graphic representation—are all numeric.

Knowing which patches comprise a performance is also difficult. Dr. T's lists a performance's patches here by name, there by number, and Sound Quest's program can read only patch numbers, not names, from one of the synthesizer's banks. To see a list of available patches, both programs make you go to another screen.

In contrast with such unfriendly screens is the editing interface in C-ZAR, Diemer Development's ed/lib for the Casio CZ series of synthesizers (Figure 2). Though the CZ synths have six eight-stage envelopes, up to four waveforms per patch, and a number of other parameters, C-ZAR is able to display them all at once. During a complex editing session you will appreciate this help in keeping oriented. C-ZAR also uses easy-to-read, on-screen knobs to show values both numerically *and* graphically; to change a value, click on the knob. The interface is not only highly intuitive, but also communicates very well with the user. The CZ synths are less complex than the TX81Z, true, but Sound Quest's D-50 screen, and ►

Synthesizers Supported by Amiga Editor/Librarians



	CRB Prod.	Diemer Develop.	Digitools	Dr. T's	MIDITALK	New Wave	Sound Quest*	Synthetic Reality	Triangle Audio
Casio									
CZ-101/1000	•	•		•		•	•		
CZ-1		•		•		•			
CZ-3000/5000				•		•	•		
VZ-1				•					
E-MU									
Proteus				•			•		
Ensoniq									
SQ-80				•			•		
ESQ-1/M				•			•		
VFX							•		
Kawai									
K-1				•			•		
K-4							•		
K-5				•					
Korg									
M1				•			•		
M1R							•		
M3R							•		
DW-8000								•	
EX-8000								•	
Lexicon									
PCM-70				•					
Oberheim									
Matrix 6/1000				•			•		
Roland									
D-110/10/20				•			•		
MT-32				•			•		
D-50				•			•		
D-70							•		
Yamaha									
DX-7II				•			•		
DX7IID/7IIFD							•		
DX7			•	•			•		
DX7S							•		
DX9			•				•		
TF1							•		
TX7				•			•		
TX802				•			•		
DX11							•		
TX81Z				•	•		•		
DX100/27/21				•			•		
FB-01			•	•			•		•

*also available: Synergy—Universal Editor/Librarian, which can control most MIDI synthesizers.

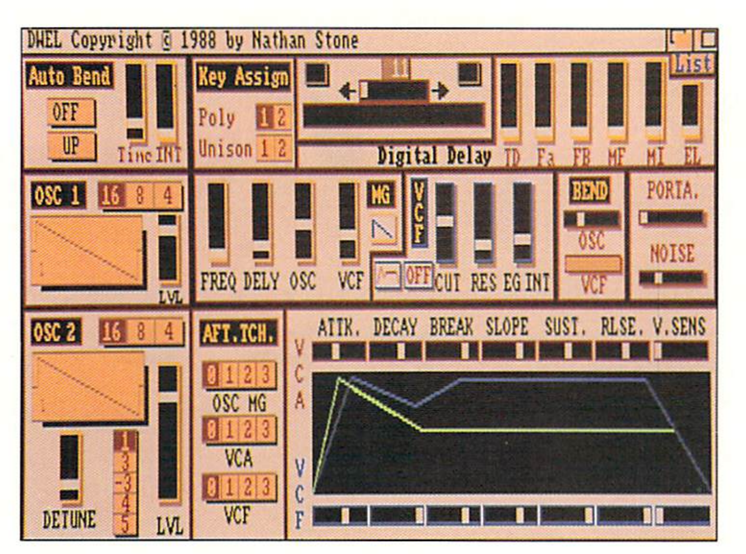


Figure 3. The graphic sliders in Dwel for the Korg DW-8000 let you see all your settings at once.

Synthetic Reality's Dwel for the Korg DW-8000 (Figure 3), both prove that a simple interface to a complex instrument can be created.

Slave Labor

One of the benefits of MIDI is the ability to play one synthesizer from the keyboard of another or from an alternate controller you play like a guitar or wind instrument. In response, manufacturers have built smaller and less expensive "slave" synths that come without keyboards and can be played only via MIDI. The units typically offer very few on-board controls, but Amiga software developers have answered the call for controlling help, offering editor/librarians for Oberheim's M-1000, Roland's D-110, Yamaha's TX81Z, and several others.

That an editor for such a synth would not allow you to play it from an external controller would seem counterproductive. Yet this is just the situation presented by both Dr. T's and Sound Quest's programs. Both product lines let you play the instrument you are editing only by clicking the right mouse button: high notes on the right of the screen, lows notes on the left. This is not an effective, real-world way to test the usefulness of a patch. For wind and guitar controllers, for which aftertouch and pitchbend are essential, it is useless. Even with a keyboard, unless you patch and repatch your MIDI connections each time you make an edit, these programs give you no way to test a sound's response to aftertouch, mod wheel or pitch bend movements, or any tonal subtlety but velocity, which you control by the mouse's vertical position.

Aside from their superior interfaces, C-ZAR and Dwel offer about the same levels of performance as Sound Quest and Dr. T's programs. Others, such as MIDITALK's TX8, are primitive. Triangle Audio's Data Filer for the Yamaha FB-01 offers adequate librarian functions, but no editing controls.

The arrival of such pro-level Amiga sequencers as Dr. T's KCS and Passport's Master Tracks Pro creates the potential for the Amiga to become a serious music computer. If the machine is to aid productivity in a MIDI environment, fast and friendly synth editors are a must. Both Sound Quest and Dr. T's are talent-laden organizations, and have done impressive work on the machine side. Now it's time they address the user interface. ■

Timothy Tully is a former editor for Electronic Musician *and writes about and reviews music products extensively. Write to him c/o* AmigaWorld *Editorial Dept., 80 Elm St., Peterborough, NH 03458.*

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CRB Productions
15 Norton St.
Nashua, NH 03060

Diemer Development
12814 Landale St.
Studio City, CA 91604
818/762-0804

DigiTools
PO Box 7417
Buffalo Grove, IL 60089
312/459-8781

Dr. T's Music Software
220 Boylston St.
Suite 206
Chestnut Hill, MA 02167
617/244-5243

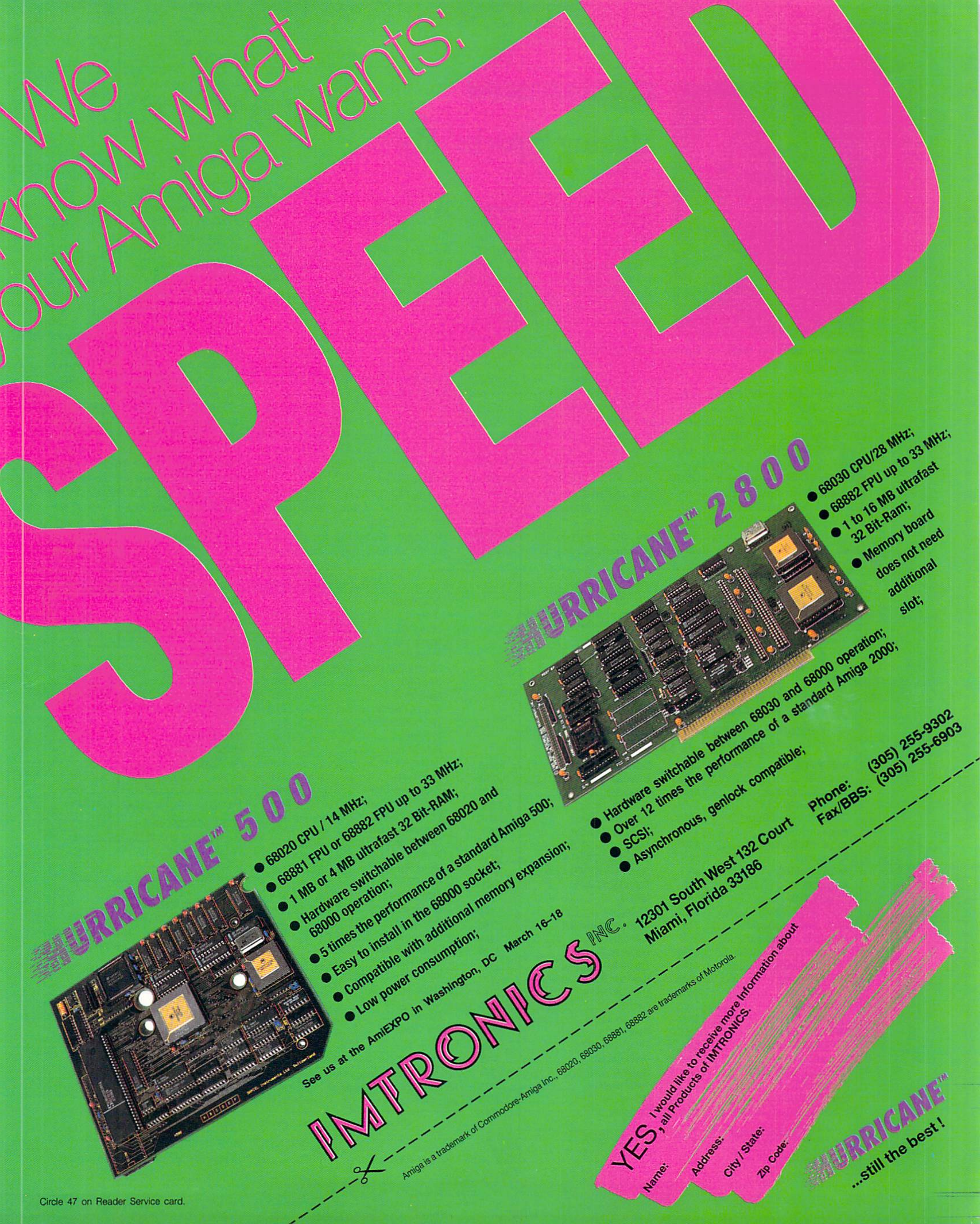
MIDITALK
PO Box 211
Averill Park, NY 12018
518/674-8466

New Wave Software
PO Box 438
St. Clair Shores, MI 48080
313/771-4465

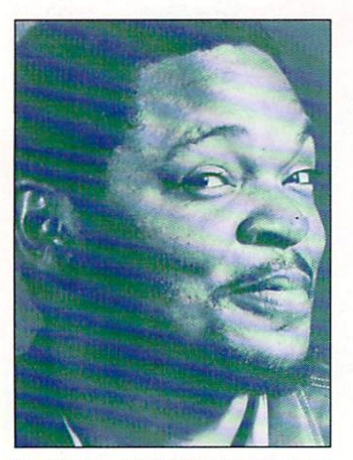
Sound Quest Inc.
1573 Eglington Ave. West
Suite 200
Toronto, Ontario
Canada M6E 2G9
416/256-0466
800/387-8720

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Jazz/blues guitarist Melvin Sparks.

AMIGA PROFILE

Making 'Sparks' Fly

A COMPUTER WITH some musical notation on screen doesn't exactly conjure up visions of Dexter Gordon wailing on his sax, or B.B. King wringing the blues from his guitar. Yet, many jazz and blues musicians—including Melvin Sparks—have found that computers help considerably with many time-consuming details when composing. "Imagine if Duke Ellington or Quincy Jones had had a computer," muses Sparks, a noted blues/jazz guitarist, composer, and Amiga proponent. "Just think of all the music they produced—and all handwritten!"

Sparks started out with a C64 and then traded up for an Amiga late in 1985 after he heard about an Amiga composition program called SoundScape (Mimetics). "It was exactly what I wanted and I went right out and bought it." Traditionally, musicians would gather in a loft somewhere and just play, he explained. While Sparks would be the first to say there's no substitute for jamming, the truth is, he admits, that musicians just don't play together as often anymore. Solitary musicians are compelled to look for alternative methods to develop and perfect their music. Many, like Sparks, discovered that computers convert time previously spent documenting scores and testing for mistakes into time devoted purely to the job at hand—making music.

And Melvin Sparks knows more than a little about making music. Sparks left Houston, Texas, at age 16 to play with legendary performer Little Richard and his band, The Upsetters. He's played with the likes of Sam Cooke, Jackie Wilson, Dr. John, and George Benson. Moving from rock to jazz and blues, he went to New York in the late '60s. Under the influence first of Jack McDuff and later Lou Donaldson, Sparks went on to record six albums, while appearing on more than two dozen others. His latest venture, a 1989 release, teamed him with saxist Hank Crawford and organist Jimmy McGriff.

Sparks remained loyal to SoundScape as long as possible, but found support for it lacking. He began searching for the program's author, Todor Fay, now at Blue Ribbon Bakery in Atlanta. Sparks discovered Fay's latest project—Bars & Pipes—was just what he wanted. Now he's back in his Mt. Vernon, NY-based studio working on his next recording.

"Bars & Pipes is so much better," claims Sparks, who especially favors the program's graphic interface. "Other programs want you to grab a calculator. With Bars & Pipes, I just play and get back to the music and don't worry about the computer. It's like a tape recorder... no typing."

Sparks is equally enthusiastic about the Amiga's role in his work and believes he has personally sold 10 to 12 machines to other musicians. "I really love this computer and I've seen them all," he laughs. "I really mean it; I think it's the best. People who come by and see mine wind up getting an Amiga."

Are you listening, Commodore?

—Jan Jackson

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IT BEGINS AS a wistful look in your eyes when your friend's powerhouse Amiga tears through applications in mere seconds, while your stock system, sans accelerator and hard disk, plods along like an old farm tractor.

Then you begin imagining how much more productive you could be if you only had a hard disk and other fancy stuff. We've seen this kind of thing before; stop fantasizing and buy yourself some hardware.

To help satisfy your wishes, our list includes everything from mini replacement mice to mega 32-bit 68030 boards.

Information listed here is subject to change as the market fluctuates. The companies we contacted supplied us only with products they expect to ship by March 1990. Where prices had not been set, "Call" was placed in the price column—meaning, contact the manufacturer, not us. For items with price ranges, the starting price is listed. The Port column describes how items are installed: Peripherals installed externally connect to ports; boards are installed internally in slots. The Machine column codes are as follows: A=A500, B=A1000, C=A2000 only, and D=A2000 series.

Compiled by Tim Walsh and Jan Jackson

ILLUSTRATED BY JACK TOM

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All screens from Amiga 1-Megabyte versions, which are the same versions running in Arcades.

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Circle 104 on Reader Service card.

CLOCKS

PRODUCT	COMPANY	PRICE	MACH.	PORT	DESCRIPTION
Exp-512	Progressive	$ 169.95	A	A501	512K clock/calendar expansion board.
MouseTime	MicroBotics	$ 39.95	B	Mouse	Clock.

COPROCESSORS

PRODUCT	COMPANY	PRICE	MACH.	PORT	DESCRIPTION
02H 500	IMtronics	$ 698.00	A	Internal	68020/16 accelerator with 68881/16 coprocessor.
02H2800	IMtronics	$1595.00	C	CPU Slot	68030/25 accelerator and 68882/25 coprocessor.
03H 500	IMtronics	$ 998.00	A	Internal	68020/16 accelerator and 68881/16 DRAM controller.
04H2800	IMtronics	$1195.00	C	CPU Slot	68020/25 processor.
05H2800	IMtronics	$1595.00	C	CPU Slot	68030/25 accelerator and 68882/25 coprocessors.
06H2800	IMtronics	$2195.00	C	CPU Slot	68030, genlocks, asynchronous design.
68020 CPU Board	CSA	$ 995.00	C	CPU slot	68020 Board; optional 16–33Mhz 68882, 68030/16.
A2088D Bridgeboard	Commodore	$ 699.95	D	IBM	Intel 8088 coprocessor, 5¼, 360K drive.
A2286D BridgeBoard	Commodore	$1599.00	D	IBM	Intel 80286 coprocessor board, 5¼ drive.
A2501 Upgrade Kit	GVP	Call	C	CPU Slot	16Mhz 68030, 68882, w/4MB bit-wide RAM, drive.
A2620/2	Commodore	$1495.00	C	CPU Slot	Includes 68020, 68881, 68851 memory management, 2MB RAM.
A2620/4	Commodore	$2799.00	C	CPU Slot	68020, 68881, 68851 memory management, 4MB RAM.
A2630	Commodore	$2195.00	C	CPU Slot	68030 accelerator boards.
A3001 Upgrade Kit	GVP	Call	C	CPU Slot	28Mhz 68030, 68882, w/4MB bit-wide RAM and drive.
Hurricane 500 (01H 500)	IMtronics	$ 549.00	A	Internal	68020/16 accelerator.
Impact A2000-030RAM/4	GVP	$1999.00	C	Piggyback	4MB 32 bit-wide RAM exp. daughterboard.
Impact A2000-030RAM/8	GVP	$3199.00	C	CPU Slot	8MB 32-bit-wide RAM exp. daughterboard.
Impact A2000-030/882/16	GVP	$1049.00	C	CPU Slot	68030 32-bit Motorola CPU, w/68882 co-processor.
Impact A2000-030/16	GVP	$ 849.00	C	CPU Slot	68030 32-bit Motorola CPU w/16Mhz clock.
Impact A2000-030/28	GVP	$ 999.00	C	CPU Slot	68030 32-bit Motorola CPU w/28Mhz clock.
Impact A2000-030/882/28	GVP	$1425.00	C	CPU Slot	68030 32-bit Motorola CPU w/28Mhz clock, 68882.
Midget Racer	CSA	$ 399.00	All	Motherboard	32-bit 68020 daughterboard w/co-processor socket.
Multifunction Module	MicroBotics	$ 99.95	All	StarBoard2	68881 socket, clock, sticky disk, parity check.

DRIVES

PRODUCT	COMPANY	PRICE	MACH.	PORT	DESCRIPTION
20MB SCSI Drive & Control	Comp-U-Save	$ 589.00	A,B	Bus	20MB SCSI hard drive and controller.
3½" External Floppy	Commodore	$ 299.95	All	Drive	880K micro floppy disk drive.
3½" Disk Drive	Comp-U-Save	$ 145.00	All	Drive	Single floppy drive with power supply.
A1000 SCSI Interface	Supra	$ 199.00	B	Bus	Pass thru, auto-config., includes real-time clock.
A2010	Commodore	$ 199.95	D	Drive Slot	880K micro floppy disk drive.
A2090A HD Controller	Commodore	$ 399.00	D	Slot	Autobooting ST506, SCSI DMA controller.
A500 HD Controller	Pacific Peripherals	Call	A	Bus	SCSI controller, can hold up to 2MB RAM.
A500 SCSI Interface	Supra	$ 199.00	A	Bus	Optional 2MB RAM.
A590	Commodore	$ 799.00	A	Bus	20MB HD, allows 2MB RAM expansion and SCSI port.
ALF System	Pre'spect	$ 678.00	A,C	Slot	HD controller, SCSI bus, several configurations.
ALF-AF-MFM or RLL	Pre'spect	Call	D	Slot	Autoboot controller, software.
ALF-AG-MEM or RLL	Pre'spect	Call	A	Bus	Includes ALF2 s/w in PROM, p/t.
ALF-AG-SCSI	Pre'spect	Call	A	Bus	Controller w/ALF2 s/w in PROMS.
ALF-DC-MFM or RLL	Pre'spect	Call	D	Slot	½-card controller, autoboot.
ALF-DE-MFM or RLL	Pre'spect	Call	A,B	Bus	Controller, adaptor w/o case.
ALF-DG-MFM or RLL	Pre'spect	Call	A,B	Bus	Autoboot w/adaptor in case.
ALF-RC-MFM or RLL	Pre'spect	Call	D	Slot	Controller, ½ card, s/w, cable.
ALF-RC-SCSI	Pre'spect	Call	D	Slot	½-card, cables, controller.
ALF-RE-MFM or RLL	Pre'spect	Call	A,B	Bus	Rebootable controller, can tower.

PRODUCT	COMPANY	PRICE	MACH.	PORT	DESCRIPTION
ALF-RG-MFM or RLL	Pre'spect	Call	A,B	Bus	Controller, adaptor, bus driver.
ALF-RG-SCSI	Pre'spect	Call	A	Bus	SCSI controller, p/thru.
ALF2 Card	Pre'spect	Call	D	Slot	SCSI controller (6), ST506 (2 drives).
ALF2 AG	Pre'spect	Call	A,B	Box	ST506 controller kit.
ALF Changeable Disk	Pre'spect	$1200.00	D	Slot	44MB HD, external ($1400), SCSI.
Amig-a-Tosh	M.A.S.T.	$ 199.00	All	External	Macintosh-compatible 3½" floppy; use w/emulators.
Auto Card	Expansion Tech	$ 179.95	A,B	Bus	Converts non-autoboot controller to autoboot.
Autobootable Overdrive	Pacific Peripherals	$ 249.00	C	Slot	DMA/SCSI overdrive controller.
CA-880	California Access	$ 229.95	All	Drive	External floppy disk drive.
CSI 3100 Drive	Centaur	$ 185.00	All	Drive	3½-inch external floppy.
CSI 3200 Drive	Centaur	$ 195.00	All	Drive	External floppy w/B.A.D. accelerator software.
CSI 3300 Mega Drive	Centaur	$ 249.00	C	IBM	Enhances XT Bridgeboard, up to 1.0MB storage.
CSI 6100 Autoboot	Centaur	$ 119.00	D	Slot	Allows full autoboot of 2090 and 2090A.
DRAM	IMtronics	$ 35.00	A	Internal	DRAM controller.
Dual 3½" Disk Drive	Comp-U-Save	$ 395.00	All	Drive	Dual floppy drive, power supply and 6' cord.
Dual 3½" Disk Drive	Comp-U-Save	$ 299.00	All	Drive	W/out power supply.
ECE Alignment Kit-1000	ECE	$ 175.00	B	N/A	Aligns disk drives, performs read/write tests.
ECE Alignment Kit	ECE	$ 175.00	A,C	N/A	Aligns disk drives, performs read/write tests.
ECONO SCSI	CSA	$ 199.00	C	Slot	Interface for hard disks and devices.
Enhanced TwinDrive	M.A.S.T.	Call	All	Drive	Two 3½-inch external floppy drives in one case.
Enhanced TwinDrive	M.A.S.T.	Call	All	Ext. Drive	Dual drive with built-in virus protection.
Enhanced Unidrive	M.A.S.T.	$ 179.00	All	Drive	3½-inch floppy w/built-in virus protection.
EPROMS-ADV	GVP	$ 150.00	C	Controller	Advanced autoboot Eprom w/removable media storage.
ESCORT 1	Expansion Tech	$ 179.95	All	Drive	Floppy drive.
Escort Hard Drive Card	Expansion Tech	$ 199.95	A,B	Bus	SCSI interface card.
ESCORT Hard Drive Systems	Expansion Tech	$ 335.00	A,B	Bus	SCSI DMA controllers, autoboot.
FastCard	Xetec	$ 199.95	C	Slot	SCSI controller, supports 3½-inch drives on card.
FastTape	Xetec	$ 599.95	A,B,C	In/Ex	Streaming tape backup systems, 60 to 150MB.
FastTrak jr.	Xetec	$ 699.95	A,B	X Box	Complete system w/20MB drive, Fast RAM option.
FastTrak Q40	Xetec	$1099.95	A,B	Bus	Quantum drive, 40MB capacity, SCSI controller.
FastTrak SA-5 Host Adapt.	Xetec	$ 249.95	A	External	Up to 8MB RAM option, SCSI, software included.
FastTrak SA-5 Host Adapt.	Xetec	$ 249.95	A	Bus	SCSI controller, RAM expansion 8MB and up.
FastTrak SA10	Xetec	$ 249.95	B	Box	SCSI cntroller, with optional RAM up to 8MB.
FData 10	Flexible Data	$ 149.95	All	External	Floppy disk drive.
FData 20	Flexible Data	$ 299.95	All	External	Dual floppy disk drive.
Filerunner Box (Flat)	Pre'spect	$ 698.00	A,B	Bus	32–124MB capacity, lo-hi level formatted.
Filerunner Box (Hvy.)	Pre'spect	$ 698.00	A,B	Bus	32–124MB ($1677) w/fan.
Filerunner Card	Pre'spect	$ 525.00	D	Slot	20–180MB ($1899) available.
Fireball	M.A.S.T.	$ 229.00	D	Card	SCSI DMA controller, Burst, Share, Throttle modes.
Fireball 180MBHC	M.A.S.T.	$1759.00	D	Internal	SCSI DMA controller, Burst, Shared, Throttle modes.
Fireball 45MBHC	M.A.S.T.	$ 739.00	D	Internal	Autoboot, SCSI controller: 90, 136, 182MB available.
Fireball 90MB HC	M.A.S.T.	$1209.00	D	Internal	SCSI DMA controller, Burst, Share, Throttle modes.
Flash Card	Expansion Tech	$ 749.95	C	Slot	32MB hard card, 48MB: $939.95.
Flash Card Controller	Expansion Tech	$ 229.95	C	Slot	SCSI interface, autoboot, DMA.
Floppy Drives	Expansion Tech	$ 179.95	All	Drive	3½-inch external drive.
Hard Disk CR	Synergy	$ 319.95	A	Drive	Kit for SCSI hard disk system.
Hard Disk Drive	CSA	$ 895.00	C	Slot	20MB drive, SCSI controller; 40MB available.
Hard Disk Plus	Synergy	$ 749.95	A	Drive	20MB, 30MB: $889.95, available w/2MB RAM $269.95.
HardFrame/2000	MicroBotics	$ 329.00	C	Slot	DMA SCSI hard disk interface, auto-booting.
HD 500	IMtronics	$ 698.00	A	Bus	32MB hard drive.
HD Subsystems	Cashe Systems	Call	All	Bus	20MB to 6660MB capacities.
HD2000	IMtronics	$ 649.00	C	Slot	Internal 32MB Hard Drive.
HD4000	IMtronics	$ 849.00	A	Bus	32MB hard drive and 4MB/0 KB.
HDA-506	Spirit	$ 263.00	A,C	Drive	HD adaptor/interface; ST-506 MFM or RLL.
Impact A2000/8/0	GVP	$ 399.00	C	Slot	SCSI/RAM DMA autobooting controller, up to 8MB RAM.
Impact A500 HD Series	GVP	Call	A	Bus	20, 30, 45MB, 40Q, 80Q, 100Q HD, RAM subsystems. ►

PRODUCT	COMPANY	PRICE	MACH.	PORT	DESCRIPTION
Impact HC Plus	GVP	Call	C	Slot	20, 30, 45MB SCSI HD on autoboot HDD controller.
Impact HC Q Series	GVP	Call	C	Slot	40, 80, 100 Quantum SCSI HD on autoboot, DMA.
Impact HC Series	GVP	Call	C	Slot	20, 30, 45MB SCSI HD, autoboot, DMA controller.
Impact HCQ Plus	GVP	Call	C	Slot	40, 80, 100 Quantum SCSI HD on autoboot HDD.
Impact SQ400	GVP	$ 149.00	C	NA	44MB Syquest Disk cartridge.
Impact SQ44	GVP	$ 999.00	C	5¼ Bay	Syquest 44MB removable HD, w/autoboot EPROM kit.
Infinit40	Interactive Vid.	Call	A,C	Ext./Int.	Controller, SyQuest drive, removable media.
Master 3-A	Konyo	$ 159.00	All	External	Floppy disk drive.
Master 5-A	Konyo	$ 229.00	All	Ext. Drive	5¼-inch floppy drive.
Max HD	Ingenuity Inc.	$ 499.00	C	Internal	Western digital 40MB drive w/card and software.
ProDrive 2000	Progressive	$ 129.95	All	Drive	880K micro floppy disk drive.
Rescued Drives	Skyles	$ 179.95	All	Drive	Refurbished Amiga A1020 5¼-inch drives.
SA1000	Comspec	$ 364.00	B	X Box	Autobooting/SCSI, supports removable media.
SA2000 Host Adaptor	Comspec	$ 246.00	D	Slot	HD SCSI controller, supports removable media.
SA500 Host Adaptor	Comspec	$ 336.00	A	Bus	SCSI controller, supports removable media devices.
SCSI Host 2000	Synergy	$ 179.95	C	Slot	Auto-configs and auto-boots from your hard disk.
SCSI Interface	CSA	$ 595.00	C	Slot	Interface for hard disks and devices.
Slimline Drive	Datel	$ 139.95	All	Drive	3½-inch external floppy drive.
StarDrive SCSI Module	MicroBotics	$ 129.95	All	StarBoard2	High-speed SCSI interface, clock.
SupraDrive 20–380MB	Supra	$ 499.00	A,B	Bus	Byte sync, SCSI, pass thru, and auto-config.
SupraDrive 44R	Supra	$ 995.00	All	Slot, Bus	Unlimited capacity with removable 44MB cartridges.
SupraDrive 4×4	Supra	$ 799.00	2000	Slot	20MB SCSI syystem; 30MB and 60MB available.
Supramodem 2400zi	Supra Corp	$ 179.00	D	Slot	Internal modem, adds a serial port.
Trump Card	Interactive Vid.	$ 199.95	C	Slot	SCSI hard disk contoller; supports AMAX.
Twindrive	M.A.S.T.	Call	All	Drive	Two 3½-inch floppy drives in one case, pass thru.
Unidrive	M.A.S.T.	$ 139.00	All	External	Upgradable to twin drive, 3½-inch external floppy.
Vault	Progressive	Call	A,B	Drive	20, 30, 40, 65 MB hard drive.
WordSync 40–105Q	Supra	$ 699.00	D	Slot	Hard card, preformatted, Wordsync DMA, 105Q: $995.
WordSync SCSI Interface	Supra	$ 179.00	D	Slot	Allows HD access during modem or MIDI operation.
X-RAM	Spirit	$ 319.00	A,B	Box	Expandable from 0K to 8MB in 2MB increments.

EXPANSION

PRODUCT	COMPANY	PRICE	MACH.	PORT	DESCRIPTION
AX-S	Spirit	$1195.00	A,B	Bus	Allows PC/XT-AT-style board expansion.
Bus Expander	Bill's Boards	$ 495.00	A,B	Bus	Sub Assemblies turn BabyAT Box into expan. chassis.
Dual Serial Board	ASDG	$ 249.00	C	Slot	Provides two additional serial ports.
Dual Serial Module	ASDG	$ 199.00	C	Twin X	Provides 2 serial ports on Twin-X board.
External HD Case	GVP	$ 259.00	A,C	Slot	External HD case allowing two ½-height cards.
GPIB Module	ASDG	$ 199.00	C	Twin X	Gives Twin X GPIB capability.
Infinity Machine	M.A.S.T.	Call	A,B	Bus	Up to 64MB of 32-bit memory, SCSI controller, 08882.
Mini-rack C	ASDG	$ 195.00	B	Bus	2-slot Zorro 1 subset, +5 volt power supply.
SD Chassis	Comspec	$ 339.00	All	Drive	Chasis holds 2 5¼- or 3½-inch devices.
Serial Solution	Checkpoint	$ 299.00	C	Serial	Adds 25 and nine-pin serial ports.
SRAMDisk	Bill's Boards	Call	D	Slot	Static RAM card w/battery back up, auto-config.
Subsystem 1000	Pacific Peripherals	$ 299.00	B	Bus	Three A2000 slots.
Subsystem 500	Pacific Peripherals	$ 249.00	A	Bus	2-A2000 slots; $399 with floppy disk drive.
TB-2122	Micro R&D	Call	B	Bus	Toolbus; allows use of A2000-style cards.
TB-2522	Micro R&D	Call	A	Bus	Toolbus; allows use of A2000-style cards.
TBE-2500	Micro R&D	Call	A	Bus	Bus expander for TB-2522.
Tool Box	Expansion Tech	$ 189.95	A,B	Bus	2-A2000 slots, 1 amp power supply; 3 amp: $259.95.
Trumpcard 500	Interactive Vid.	$ 269.95	A	Bus	Includes expansion chassis, SCSI controller, cable.
Twin X	ASDG	$ 329.00	C	Slot	Dual IEEE 959 interface board.

GRAPHICS/VIDEO

PRODUCT	COMPANY	PRICE	MACH.	PORT	DESCRIPTION
4004 Genlockable Encoder	Magni Systems	$ 1695.00	D	IBM, Video	Genlock w/fading, keying; w/control box: $1995.
4004S Genlockable Encoder	Magni Systems	$ 1695.00	C	IBM	Adds SIMS output capability to 4004 features.
A2300 Genlock	Commodore	$ 399.00	C	Video slot	Overlay Amiga graphics on PAL or NTSC video.
Amiga Light Pen Driver	Inkwell	$ 129.95	All	Mouse	Light pen and driver.
AmiGen	Mimetics	$ 199.95	All	RGB	NTSC genlock; overlay.
AmiLink	RGB Video	$ 6950.00	A,D	Serial	Interactive video editing controller.
AProDraw	R & DL	$ 499.00	All	Serial	9×6 Summagraphics draw tablet w/stylus, cursor.
AProDraw	R & DL	$ 599.00	All	Serial	12×12 Summagraphics draw tablet w/stylus, cursor.
AProDraw	R & DL	$ 999.00	All	Serial	12×18 Summagraphics draw tablet w/stylus, cursor.
Color Splitter	MicroSearch	$ 150.00	All	Digitizer	Electronic color separator; use with digitizers.
Digi-Droid	New Tek	$ 79.95	All	Joystick	Automated filter wheel for Digi-View.
Digi-View Gold	New Tek	$ 199.95	A,C	Parallel	Video digitizer with powered gender changer.
Easyl 1000	Anakin Research	$ 449.00	B	Serial	Pressure sensitive graphics tablet; auto-config.
Easyl 2000	Anakin	$ 499.00	C	Slot	Pressure sensitive graphics tablet: auto-config.
Easyl 500	Anakin Research	$ 399.00	A	Expansion	Pressure sensitive drawing tablet; auto-config.
fF Genlock Compatibility	MicroWay	$ 50.00	D	flickerFixer	Enhancement; lets fF work with NTSC genlock.
Flick-Off	M.A.S.T.	$ 399.00	A,B	Denise soc	Reduces hi-res jitter on Multi-sync monitors.
flickerFixer	MicroWay	$ 595.00	D	Slot	Reduces interlace flicker, scan lines.
Frame Buffer	Mimetics	$ 549.95	C	Slot	Stores and displays color frame overscanned image.
Frame Capture	Mimetics	$ 199.95	All	Frame Buff	Optional chip set for use with Frame Buffer.
FrameGrabber	Progressive	$ 699.95	All	Parallel	Real-time color digitizer.
FrameGrabber-256	Progressive	$ 724.95	All	Parallel	Real-time color digitizer.
Future Touch 13 Kit	Amigo	$ 1195.00	All	Serial	Converts video monitors into touch screens.
Future Touch System	Amigo	$ 3495.00	C	N/A	Kiosk w/A2000, drive, 1MB RAM, and T/S monitor.
Geniscan	Datel	$ 299.95	All	Parallel	Hand scanner; 4⅛-inch scanning width, 4000 dpi.
Image Worksystem	Amicore	$18000.00	N/A	N/A	Image processing and analysis system, up to 30K.
Imprint 3.0	Liquid Light	$ 2495.00	All	Serial	Polaroid Palette image recorder and software.
Interlock	Spirit	$ 695.00	All	RGB	Genlock with looping video input; NTSC, PAL.
IR Remote Controller	Edu-Vid Research	$ 180.00	All	Parallel	Control infrared devices via software.
IS Penmouse	Kurta	$ 295.00	All	Serial	Tablet w/cordless devices, cable, software.
IS/ONE	Kurta	$ 5251.00	ABC	Joystick	Graphic tablet with driver software and cables.
JX100	ASDG/Sharp	$ 995.00	All	N/A	200 dpi, 4×6.4 inches, 18-bit color scanner.
JX300	ASDG/Sharp	$ 3995.00	C	N/A	300 dpi, 8.5×11 inches, 24-bit color scanner.
JX450	ASDG/Sharp	$ 6995.00	C	N/A	300 dpi, 11×17 inches, 24-bit color scanner.
Light Pen & Driver	Inkwell Systems	$ 129.95	All	Joystick	Hi-res light pen and software.
LIVE!	A-Squared	$ 295.00	B	Bus	Real-time video digitizer w/HAM support.
LIVE!	A-Squared	$ 450.00	C	Slot	Real-time video digitizer w/video effects.
LIVE!	A-Squared	$ 399.00	A	Bus	Real-time video digitizer w/power supply.
M/P ED Beta Video	Interactive Micro	$13998.00	All	N/A	Sony ED Beta deck, camera, and A2500.
M/P Hi 8MM Video	Interactive Micro	$ 6199.00	All	N/A	Sony Hi 8MM deck, camcorder, and A500.
M/P Interactive System	Interactive Micro	$ 982.00	All	Joystick	Sony MDP-510 Laser disk player.
M/P VHS Video Production	Interactive Micro	$ 2499.00	All	Joystick	Sony VHS video deck, Amiga system.
Mediaphile 1.3 System	Interactive Micro	$ 344.00	All	Mouse	Audio/Video editing, hardware/software package.
MicroSearch Digi-View	SunRize	$ 99.95	All	Digitizer	Replaces color wheel for digitizers.
miniGEN	Progressive	$ 229.95	All	RGB	Broadcast-quality genlock, switches modes.
Neriki Image Master Pro	Neriki	$ 2195.00	All	RGB	Encodes and syncs RGB output to composite signal.
Omni-GEN 701/702	Omicron Video	$ 1595.00	All	RGB	Produces composite or Y/C 358 video signals, PAL.
Omni-GEN 711	Omicron Video	$ 2495.00	All	RGB	S-VHS/NTSC genlock system produces separate Y/C, PAL.
Omni-GEN 721/722	Omicron	$ 3500.00	All	RGB	Multi-format genlock system.
Presentation Workstation	Amicore Int.	$18000.00	N/A	N/A	Produces multi-media presentations.
ProGEN	Progressive	$ 449.95	All	RGB	Genlocks from VHS, S-VHS, MII, or Betacam formats.
Realtime Video Digitizer	Datel	$ 139.95	All	Parallel	Takes composite video from video, recorder.
S-V Post Series	Amicore	$30000.00	N/A	N/A	Commercial post production system.
S-View: The Connection	Software Sensations	$ 79.95	All	Parallel	Cable compatible with Amiga S-Video encoders. ►

PRODUCT	COMPANY	PRICE	MACH.	PORT	DESCRIPTION
Scanlock VSL-1	VidTech	$ 995.00	A,B,C	RGB out	External broadcast-quality genlock; p/t, auto-config.
Scanner Interface Package	Gold Disk	$1195.00	All	Parallel	Canon IX12 300 DPI scanner with interface.
Scannery	Inset Systems	$ 250.00	A,C	Parallel	Interface cable and software for HP Laser Jet.
Sewview I	Skyles	$ 29.95	All	External	Analog RGB to NTSC composite color converter.
Sewview II	Skyles/Commodore	$ 29.95	All	External	Analog RGB to chroma/luma converter.
SuperGen	Digital Creation	$ 749.95	All	RGB	Genlock, broadcast quality, fade in and out.
SuperGen 2000S	Digital Creation	$1995.00	C	Video	True S-VHS compatible genlock and overlay device.
SuperGen-SC	Digital Creation	$ 599.95	D	Video	Internal version, encodes RGB to composite.
TCRG-102	MicroIllusions	$ 799.95	All	Serial	Time code reader/generator syncs graphics, sound.
Touch Screen Monitor	Amigo	$1595.00	C	Video	13 inch RGB; $2995 for 19 inch RGB Sony monitor.
VCR-Edit	K & M	$ 49.95	All	Serial	Hardware/sofware splices animations.
VD I	Impulse	$1000.00	All	Parallel	Real-time video digitizer and 24-bit frame buffer.
Video Pro Series	Amicore	Call	All	N/A	Post production system w/Amiga character generator.
Video Toaster	New Tek	$1299.00	C	Video slot	Digital video effects, frame capture, genlock.
X-Specs 3D	Haitex	$ 124.95	All	Mouse	Three dimensional viewing glasses.

INTERFACE/NETWORKING

PRODUCT	COMPANY	PRICE	MACH.	PORT	DESCRIPTION
A520	Commodore	$ 49.00	A,D	Video	Composite/RF adapter.
Adaptor In-A-Cable	M.A.S.T.	$ 129.00	All	Parallel	SCSI cable adaptor connects to printer.
Amiga GPIB	ACDA	$ 495.00	C	Slot	IEEE-488 interface to 14 devices w/software.
Comports 4/8	Amigo	$ 299.95	C	Serial	4- or 8-channel RS-232 communications interface.
DigiScope	ACDA	$ 139.95	All	Parallel	Digital storage oscilloscope emulator.
DS Filters Option	ACDA	$ 179.95	All	Parallel	Enhancement for DigiScope.
Fast FAX	MichTron	$ 699.95	C	RS-232C	Group III fax machine capabilities.
MCS 1000	Comspec	$ 199.00	All	Parallel	IEEE printer interface.
Microshare MCS 8000	Comspec	$ 599.00	All	Parallel	Allows 8 computers to share a parallel printer.
PrInterface	Interactive Vid.	$ 79.95	A,B,C	Parallel	Adds 2nd Centronics parallel output port.
Pro-Board	Centaur	Call	All	Parallel	Networking board.
Professional ScanLab	ASDG	$ 995.00	C	Slot	Interface for Sharp JX-300, 450-color scanners.
Proto 40K	ACDA	Call	C	Slot	16-channel 12-bit A/D; 2-channel 8-bit A/D.
Proto 5K	ACDA	$ 279.00	All	Parallel	1-channel A/D converter; amplifier, VU meter.

MEMORY

PRODUCT	COMPANY	PRICE	MACH.	PORT	DESCRIPTION
.5MB Clock/Calendar	Skyles	$ 79.95	A	Internal	Unpopulated A501 replacement; w/512K RAM: $179.95
08M2000	IMtronics	$ 498.00	C	Slot	Memory board for H2000 and H2800.
1.5MB Internal Memory	Skyles	$ 249.95	B	Motherboard	Unpopulated; .5MB-$339.95; 1MB-$399.95; 1.5MB-$530.
½ MB RAM	Supra	$ 119.00	A	Internal	Replacement for A501, 512K RAM, clock.
2 MEG Memory Board	ASDG	$ 150.00	B	Slot	Unpopulated 2MB memory board, Zorro 1.
2MB Internal Memory	Skyles	$ 269.95	A	Internal	Unpopulated, 1MB: $349.95, 2MB $449.95.
8 MEG Memory Board	ASDG	$ 275.00	B	Slot	Unpopulated 8MB memory board, Zorro 1.
8-UP! (DIP)	MicroBotics	$ 199.00	C	Slot	Unpopulated 8MB board, uses standard 1M-bit DRAMS.
8-UP! (SIMM)	MicroBotics	$ 199.00	C	Slot	Unpopulated 8MB RAM board, uses PopSimms or SIMM.
8MB Internal Memory Board	Skyles	$ 199.95	C	Slot	0K-$199.95, 2MB-$379.95 w/2, 4, 8MB available.
A501 Memory Extension	Commodore	$ 199.95	A	Internal	512K RAM with clock/calendar.
A2058/2	Commodore	$ 799.00	D	Slot	Available with 4MB, expandable to 8MB RAM.
A2501-4MB/0	GVP	$2499.00	C	CPU Slot	16MHz 68030, 68882, 4MB RAM.
A2501-4MB/400	GVP	$2959.00	C	CPU Slot	16MHz 68030, 68882, 400 drive.
A2501-4MB/80Q	GVP	$3249.00	C	CPU Slot	16MHz 68030, 68882, 4MB RAM, 80Q drive.
A3001-4MB/0	GVP	$2849.00	C	CPU Slot	RAM daughterboard, 8MB 32-bit RAM.
A3001-4MB/40Q	GVP	$3250.00	C	CPU Slot	25MHz 68030, 68882, 4MB RAM, 40Q drive. ►

PRODUCT	COMPANY	PRICE	MACH.	PORT	DESCRIPTION
A3001-4MB/80Q	GVP	$3599.00	C	CPU Slot	25MHz 68030, 68882, 4MB RAM, 80Q drive.
Ammeg 1	Kline-Tronics	$ 163.95	B	Box	1MB 0 wait state design, auto-config.
AX 2000	Comspec	$ 870.00	B	Parallel	2MB expansion.
CSI 8800 Mini Max-2	Centaur	$ 50.00	A	A501	Memory expansion, clock, unpopulated, up to 2MB.
DragStrip	CSA	$ 795.00	C	Slot	Converts 16-bit RAM to 32 bits.
Exp-1000	Progressive	$ 299.95	A	Motherboard	1MB internal expansion board, auto-config.
Exp-8000	Progressive	$ 429.95	A	Motherboard	Autoconfiguring 8MB expansion board.
FastPac	CSA	$1295.00	C	Slot	32-bit static RAM board includes KickStart.
FastRam	Xetec	$ 99.95	A,B	FastTrak	Memory option for FastTrak systems, socketed SIMMs.
IN 1000	Spirit	$ 289.00	B	Card	4-layer PC board, socketed, expandable from 0K.
IN500	Spirit	$ 289.00	A	Card	1.5MB internal memory expansion from 0K.
Insider II	Michigan Software	$ 309.00	B	Internal	Unpop. RAM boards; 1MB: $369, 1½MB: $429; clock.
M501 Memory & Clock Exp.	MicroBotics	$ 129.00	A	A501	Standard 512K expansion with clock, unpop.: $54.95.
Maxi Megs	M.A.S.T.	Call	A	A501 slot	2MB internal, can be switched in, out of video RAM.
Megaboard 2000	Progressive	$ 229.95	C	Slot	2MB expansion board, upgrades to 8MB.
Meml.8	IMtronics	$ 149.00	A	Internal	Unpopulated memory expansion board.
Memory Module	Supra	$ 349.00	A,B	SupraDrive	2MB memory board, fits inside SCSI interface.
Meta4	Interactive Vid.	$ 329.95	C	Exp. Slot	↑4MB RAM expansion in 1MB increments.
Micromegs	M.A.S.T.	$ 109.00	A	Internal	512K RAM board, w/clock, calendar, uses 1MB DRAMS.
MIDI Transport	Passport Designs	$ 459.00	All	RS232	Professional MIDI-SMPTE interface.
MiniMegs	M.A.S.T.	Call	A,B	Bus	2MB external RAM board, auto-configs, tachometer.
Minimegs	M.A.S.T.	$ 169.00	A,B	Bus	2MB RAM board, auto-configs, compact size.
Minimegs Plus	M.A.S.T.	Call	A,B	External	8MB RAM board, converts to 16- or 32-bit.
Octabyte	Spirit	$ 289.00	C	Card	Expandable from 0K to 8MB in 2MB increments.
Octo-Plus	M.A.S.T.	Call	C	Internal	8MB RAM, autoconfigures.
Pico Megs	M.A.S.T.	Call	A,B	Infinity	32-bit 2MB memory module for Infinity Machine.
PopSIMMs	MicroBotics	$ 89.95	C	8-UP!	Unpopulated SIMM boards, 1MB capacity.
ProRAM 2000	Progressive	$ 299.95	C	Slot	Expansion board, upgrades to 8MB.
RAM Expansion Card	Datel	$ 99.95	A	A501	512K RAM expansion card; clock/calendar option.
RC4 Ramcard	Digitronics	$ 225.00	C	Slot	A 100-pin expansion card, accepts RAM chips.
RC4 Ramcard	Digitronics	$ 225.00	A	Expansion	0K; $325 for expansion box.
RE 2000-0	Comspec	$ 280.00	C	Slot	Unpopulated card expandable to 2MB.
SIN-500	Spirit	$ 289.00	A	Card	0K, expandable to 2MB, uses 256K×4 DRAMS.
StarBoard2	MicroBotics	$ 339.00	A,B	Bus (PT)	512K RAM, upgradeable to 1MB.
Supra RAM 500	Supra	$ 119.00	A	A501	512K RAM and clock.
SupraRam	Supra	$ 349.00	A	Interface	2MB RAM for Supra SCSI interface.
SupraRam 2000	Supra	$ 499.00	D	Slot	2MB memory expansion, 4, 6, and 8MB available.
SupraRam 2000	Supra	$ 399.00	D	Slot	Supports 2, 4, 6, and 8MB; four-layer PCB.
The Phantom	Dr. T's	$ 300.00	All	Serial	Allows MIDI sequencers to sync with SMPTE.
Trapper	Spirit	$ 69.00	A	Card	512K internal memory expansion.

MISCELLANEOUS

PRODUCT	COMPANY	PRICE	MACH.	PORT	DESCRIPTION
A1680	Commodore	$ 149.95	All	Serial	1200 baud external modem.
AM-200A Prototyping Board	NES Inc.	$ 49.95	C	N/A	Provides architecture for custom boards.
A-Max	ReadySoft	$ 199.95	All	Ext. Drive	Macintosh emulator.
Bridge Drive Commander	MJ Systems	$ 97.50	C	Int. Drive	Lets Bridgeboard use Amiga drives.
Auto Droid	MicroSearch	$ 59.95	All	N/A	Motorizes Digi-View color wheel.
Color Splitter	SunRize Indus.	$ 99.95	All	N/A	Replaces color wheel for digitizers.
Cordless Mouse	Practical Solutions	$ 129.95	All	Mouse	Mouse with no strings attached.
Cordless Mouse	Meridian	$ 199.00	All	Mouse	Infrared controlled device accurate to 4 feet.
CSI 5500 Boing! Mouse	Centaur	$ 149.00	All	Mouse	Optical 3 button mouse.
Digi-Droid	NewTek	$ 79.95	All	N/A	Automatic motorized filter wheel for DV Gold.
Dual Gun Adapter	Actionware	$ 39.95	A,C	Joystick	Allows use of two Phaser Guns simultaneously. ►

PRODUCT	COMPANY	PRICE	MACH.	PORT	DESCRIPTION
Genius Mouse	Datel	$ 49.95	All	Mouse	Mouse replacement, 6-foot cord.
Impact Tapestore	GVP	$ 125.00	C	Controller	EPROM kit w/one 150MB tape cartridge.
Impact WT150	GVP	$ 899.00	C	5¼ Bay	Wangtek 150MB streaming tape backup system.
IS/Three	Kurta	Call	ABC	Serial	Freestanding digitizer tablet and interface cable.
Kwikstart Plus	Michigan Software	$ 169.95	B	Internal	Puts 1.3 Kickstart in ROM, adds 256K RAM.
Mouse Master	Practical Solutions	$ 39.95	All	Mse./Joy.	Mouse and joystick switchbox.
PC Elevator 386	Applied Reasoning	$1795.00	C	IBM	Increases power of Commodore A2088 Bridgeboard.
Phaser Gun	Actionware	$ 49.95	All	Joystick	Light gun for compatible games.
Prototyping Board	Celestial Systems	$ 49.95	C	Slot	Unpopulated Zorro 2 board.
Robotarm	Datel	$ 89.95	All	Joystick	Joystick controlled mechanical arm.
SB2000 Adaptor Card	MicroBotics	$ 49.95	C	Slot	Adapts StarBoard2 1000 version to A2000.
Secure Data Cartridge	CSA	$ 995.00	C	NA	Security encasement for CSA hard disk drive.
Serial Expander 2000	Golden Hawk	$ 19.95	C	Serial	Allows use of A1000 serial devices.
Supramodem 2400zi	Supra	$ 179.00	2000	Slot	Internal modem, asynchronous 2400/1200/300 baud.
Synchro Express	Datel	$ 69.95	All	Drive	Hardware/software combination disk copying system.
T1000	Amicore	$ 19.95	B	Parallel	Adaptor cable; allows use of A500, A2000 devices.
The Brick	Expansion Tech	$ 119.95	A	Power	Replacement/upgrade power supply.

MUSIC/SOUND

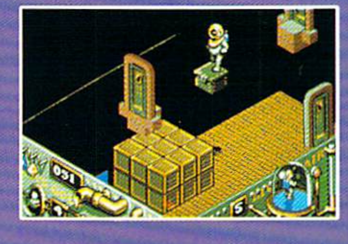
PRODUCT	COMPANY	PRICE	MACH.	PORT	DESCRIPTION
A.M.A.S.	Microdeal	$ 169.95	All	Serial	8-bit stereo digitizer w/MIDI interface.
AmiSound	AmiTech	$ 99.95	All	Serial	Sound amplifier, power control box.
Audio 2000	Day's	$ 79.95	C	IBM slot	Internal stereo amplifier.
AudioLink	Beta Unlimited	$ 795.00	All	Serial	16-bit linear stereo processor w/sampling.
Data Acquisition	Datel	$ 179.95	All	Serial	Sample and display events: hours to microseconds.
Deluxe MIDI Interface	Pro-Tronic	$ 89.95	All	Serial	IN, THRU, THRU/OUT switchable.
Harmony	Impulse	$ 200.00	All	Call	Recognition of tonal frequencies.
MIDI For Amiga	Skyles	$ 49.95	All	Serial	MIDI w/one IN, two OUTs, one THRU.
MIDI Gold Insider	Golden Hawk	$ 89.95	C	Serial	MIDI-IN/THRU, 2 OUTs.
MIDI Interface	ECE	$ 64.95	All	Serial	MIDI-IN, OUT and THRU.
MIDI Interface	Mimetics	$ 49.95	All	Serial	MIDI-IN, OUT.
MIDI Music Manager	Datel	$ 39.95	All	Serial	Eight real-time tracks; play and record tracks.
MIDI-Gold 500	Golden Hawk	$ 79.00	A	Serial	MIDI-IN, two OUTs, and switchable OUT.
MIDI-Star	Spirit	$ 263.00	All	Serial	Multiple port MIDI interface; 2 INs, 6 OUT, THRU.
MidiMaster	Datel	$ 59.95	All	Serial	Standard MIDI interface; IN, OUT, THRU.
MindLight 7	Visual Aural	$ 198.00	All	Joystick	Audio processing module, includes oscilloscope.
Pelican MIDI Processor	Future Music	$ 149.00	All	Serial	Channel and event-processor.
Perfect Sound 3.0	SunRize	$ 99.95	A,B	Parallel	Two-channel stereo digitizer, digital gain.
Practice Center	The Piano Professor	Call	N/A	N/A	Interactive workstation, MIDI keyboard, computer.
Pro-MIDI Interface	Pro-Tronic	$ 64.95	All	Serial	IN, THRU, 2 OUTs.
Sound Sampler	Mimetics	$ 99.95	All	2nd Joystick	Audio digitizer.
Stereo Sound Sampler	Datel	$ 99.95	All	Serial	Features 5-octave keyboard, 4-track sequencer.
VoRecOne	Impulse	$ 159.95	All	Joystick	Voice recognition.
BaudBandit-2400	Progressive	$ 169.95	All	RS-232	2400 baud modem w/privacy circuitry shielding.
BaudBandit-Level 5	Progressive	$ 249.95	All	RS-232	2400 baud modem, 4800 baud w/other Level 5s. ►

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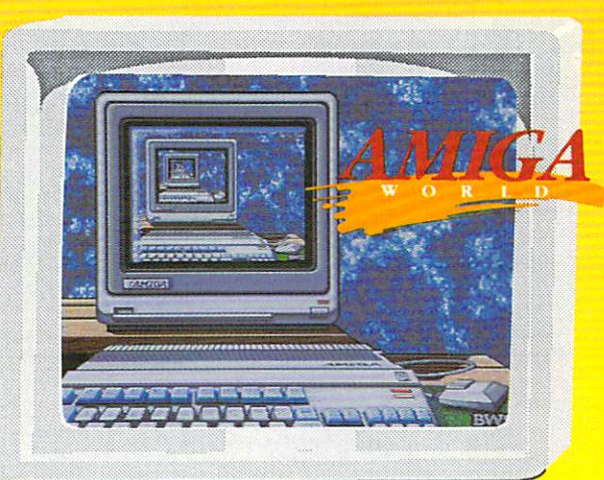
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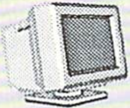
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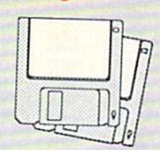
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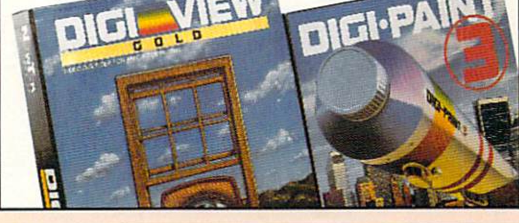
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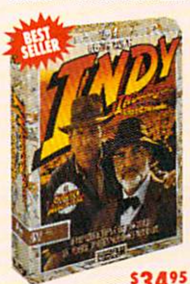
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13

A continuing series of tips, techniques, and tricks for creating more imaginative Amiga graphics.

By Joel Hagen

Freehand Animation

Part I: The Pencil Test

REAL-TIME ANIMATION is one of the distinguishing strengths of the Amiga, and any number of excellent Amiga programs complement the system's capabilities in this area. While "Accent" has not featured specific animation procedures very often in the past, a previous column (June '89, p. 50) did examine cel techniques with The Director (Right Answers Group) using its partial-screen page-flipping, or "BLIT," feature. Here, and in the next issue, we will take one of this column's special favorites—DeluxePaint III (Electronic Arts)—and explore some fundamentals of freehand animation.

By "freehand animation," I am referring to the process of drawing each frame by hand, making gradual changes to create the illusion of smooth motion. The subject could be anything from a cartoon character to a tree waving in the wind. The technique I will outline involves creating the finished animation in two to four stages. Stage one—the "pencil test" phase of drawing and testing—is the subject of the present column. I will cover the three other stages—coloring, compositing elements, and postproduction enhancement—next month.

Put on a Happy Face

A face is a good subject to experiment with in developing animation techniques. You can achieve a great deal of character with fairly elementary drawing skills. Recall how easily we acknowledge a few lines and a circle as a "happy face." Our perception is so acutely tuned to nuances of facial expressions in other humans, that by simply shifting a few lines in a very symbolic abstraction, we can convey a great range of expression. The primary elements conveying expression are the eyebrows and the mouth. Simple lines—an upturned mouth and brows arching up in the middle of the forehead—make a cartoon face happy. Make the face sad by turning the mouth corners down, register surprise by making the mouth a small circle and raising the brows higher, or suggest anger by changing the brows to angle down in the center of the forehead while turning the mouth corners down. Keep your first experiments relatively simple for clarity, and to reduce the work load over a long sequence. Learn how much detail is enough to convey character.

From the Anim menu select Frames, then Set #. To begin you might try working with only five or six frames just to see how things operate. Create a palette with an easy-to-view "paper" color, and two different drawing colors. (I am purposely using the term "paper" color instead of background color to avoid confusion later. Remember that this palette is for the drawing stage of the animation; you can adjust all colors later at the coloring stage to suit the nature and requirements of the finished piece.)

Clear All Frames to the paper color you have created. You will be drawing only the animated character. Any background scene you may want behind the character will be painted separately and composited with the character at stage three. The two drawing colors should be adjacent to each other in the palette, allowing you to toggle between them with the bracket keys ([and]). Select one of these colors and draw the first frame. For this project, choose a style that lends itself to later coloring with the Fill tool. Use solid, unbroken lines to delineate any area to be colored. I suggest using the single-pixel brush in the solid-line mode—"d" from the keyboard.

When the frame is finished and you have made any necessary corrections, go to the Effect menu and select Background > Fix. Fixing the background

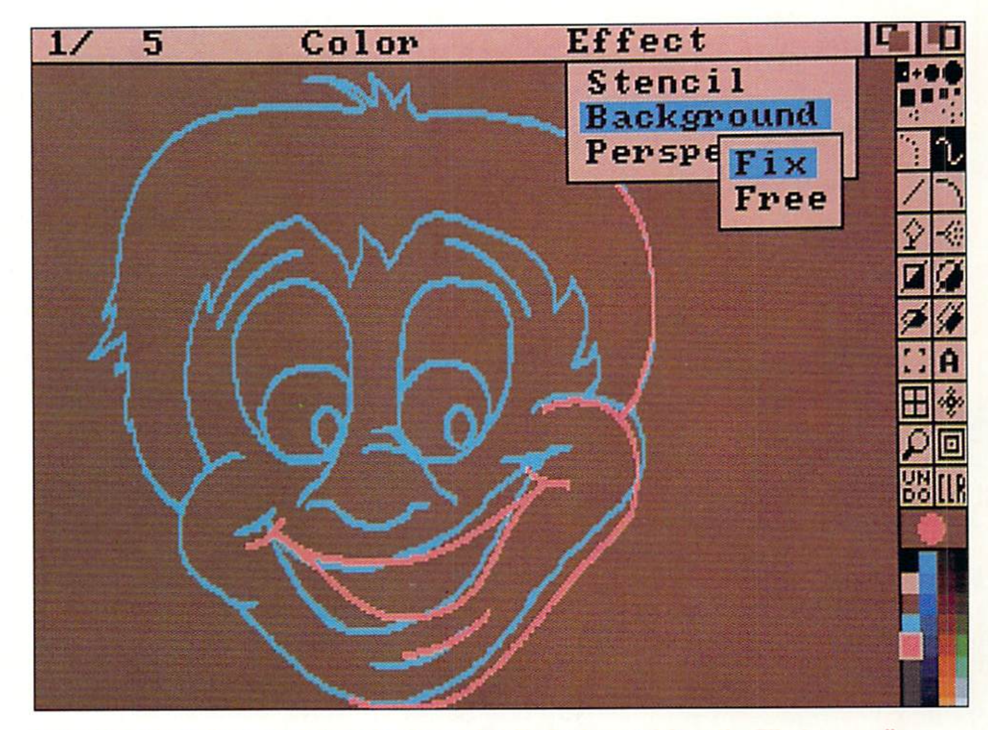
Mastering these few simple techniques can put you on the move towards creating crisp, smoothly flowing animations.

means that you may now draw over the image, and then erase or clear to that image rather than to a blank screen. In this case it is also the key to simulating an animator's light table (see the accompanying illustration). An animator, working on a glass drawing table lighted from underneath, can register a new sheet of paper over a previous frame and see the lines of that frame through the new sheet. He or she then uses this as a drawing reference. We can do much the same thing in DPaint.

And to Top My Previous Effort...

In our illustration, the upper left corner of the menu bar still shows us on frame one of our animation. Select the second drawing color or use the [ ] keys to toggle between the two colors. Using the lines of the first image as a reference, draw the second frame right on top of it as shown. Feel free to make any necessary corrections because the underlying image is protected. When you are finished, hit the 2 key to advance to the next frame of the animation. The new image will disappear from frame one, and transfer to frame two. Select Background > Free in the Effect menu to stamp that image down in frame two, and immediately fix the background (Fix > Background) again in preparation for drawing the third frame.

Being able to see the previous frame as you draw the current frame allows you to accurately judge the amount of movement to create and to keep all elements well registered, so that, for example, the nose is not jittering around on the face while the character smiles. Toggling between two drawing colors keeps the lines of the new image distinct from those of the previous one. Continue this sequence of Fix, Toggle Color, Draw, Advance Frame, and Free until you have completed all frames. You can always roll the pages of your animation backward and forward with the 1 and 2 keys to check the flow of motion. When you have finsihed, play the animation with the 4, 5, or 6 key.

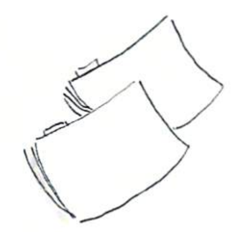


In the "Pencil Test" phase of the animation, using Fix Background from the Effect menu allows you to simulate the light-table approach of traditional animators.

The animated image will flicker annoyingly because alternate frames are drawn in different colors. To make the lines in all frames the same color, go to the Stencil tool in the Effect menu and select the "paper" color of your animation frames. Click on Make Stencil and return to the main menu and tools. Use the Clear tool to make the line color in all frames the same. Knowing that Clear will change any unlocked colors on the screen to the currently selected background color, choose a good line color as the background color, hit Clear, and click the All Frames option. Stencil protects the "paper" color of your animation, while Clear changes all other colors frame by frame to the background color you have just selected. Free the Stencil when finished. The result is a clean line animation ready for coloring.

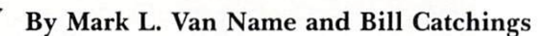
In my next column we will continue the exploration of freehand animation technique—addressing coloring, compositing, and postproduction enhancement. ■

Joel Hagen's credits include work in art, astronomy, science fiction, and software development. Write to him at 10512 Sawyer, Oakdale, CA 95361. Please include a stamped, self-addressed envelope.

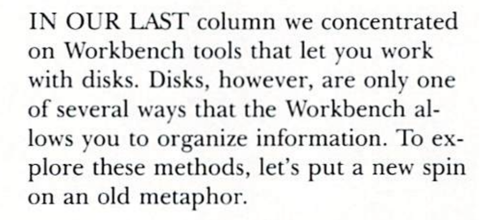


Back to Basics Part 2

Our AmigaDOS experts continue their introductory series to help acquaint new users with the Amiga's operating system.



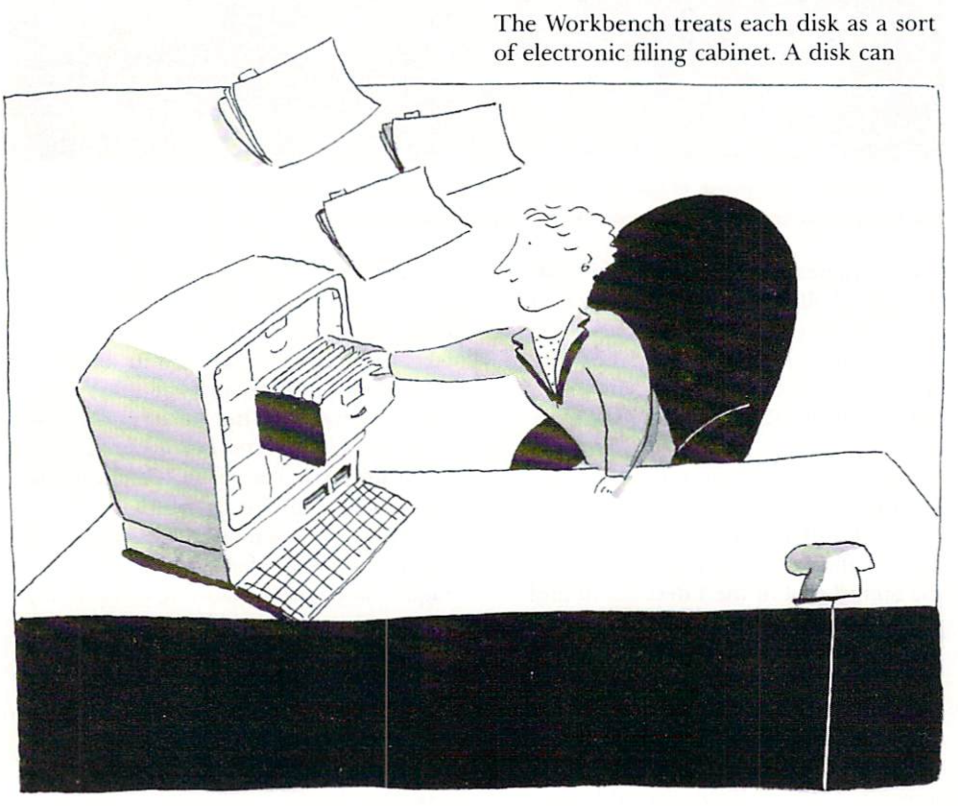
By Mark L. Van Name and Bill Catchings



IN OUR LAST column we concentrated on Workbench tools that let you work with disks. Disks, however, are only one of several ways that the Workbench allows you to organize information. To explore these methods, let's put a new spin on an old metaphor.

THE ELECTRONIC FILING CABINET

The Workbench treats each disk as a sort of electronic filing cabinet. A disk can contain three kinds of objects: projects, tools, and drawers.



A *project* is basically the electronic equivalent of a paper file. It is typically a file created with a spreadsheet, database, word processor, or graphics program—in short, anything that you store and manipulate with your Amiga.

To manipulate a project you need a *tool*—generally a piece of software. Like your Workbench Notepad and Calculator, it may have come with your Amiga, or it may be a program you purchased separately from a third-party vendor.

A *drawer* is simply a named holding place. It can contain tools, projects, or even other drawers—allowing you to organize your information hierarchically. For example, you might have a Taxes drawer that contains one drawer for each year, and in each year's drawer store the tax spreadsheets for that year.

All four of these basic Amiga information objects—disks, drawers, tools, and projects—have icons that you can see and manipulate, at least in the Workbench environment. As you might already know, the Amiga is a two-headed beast: In addition to the icon-oriented Workbench, there is a command-line user interface, the CLI (also referred to as the Shell in AmigaDOS 1.3). The CLI uses the same basic information objects as the Workbench, but it gives some of them different names. Disks are still disks, but drawers are listed as directo- ►

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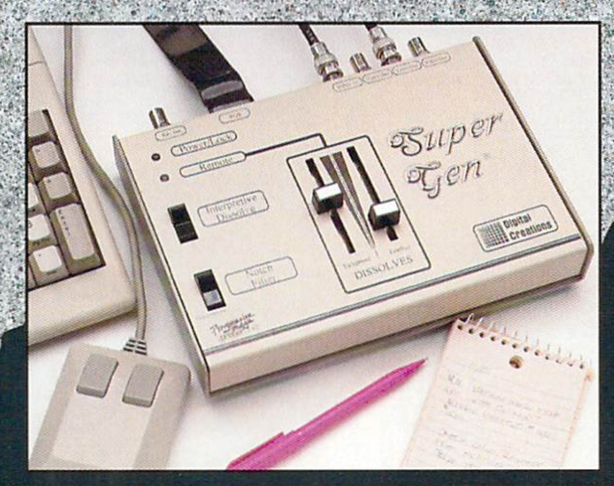
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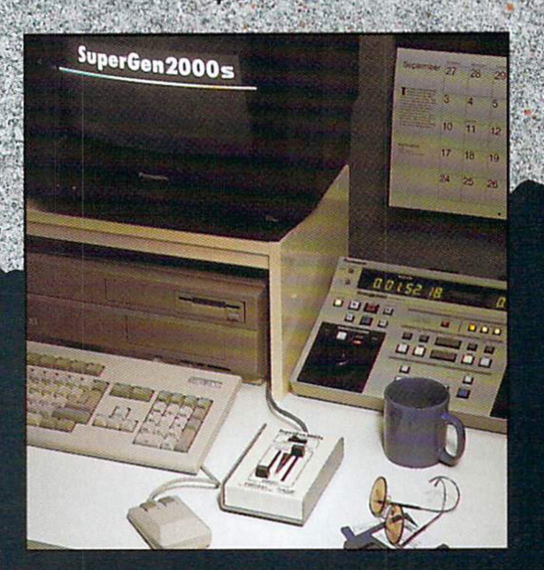
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ries. The CLI also treats projects and tools as files, but with a difference: You can execute some files as programs (tools), but not others (projects).

Inside the CLI, files and directories also have icons, but those icons are just special files with a particular type of name. (The icon name of a file is the file or directory name plus the extension ".info." Thus, the Notepad's icon file is Notepad.info.) The CLI also lets you have files and directories without icons. There are many such files on the Workbench disk, and none of them are visible from the Workbench. To see a file displayed on the Workbench screen, it must have an icon.

Know Your Disk Objects

Back to the Workbench—for now. The Workbench gives you several ways to learn about disk objects. The easiest way to examine an object is to open it. You can open an object either by *selecting* it (positioning the pointer over its icon and clicking once with the left mouse button) and then choosing Open from the Workbench menu, or by double-clicking the left mouse button (again with the pointer positioned over its icon).

When you open a disk or drawer, you get to see the drawers and files inside it that have icons assigned to them. If you open the Workbench disk, you will see several drawers, including one labeled Utilities. Open the Utilities drawer to find such tools as the Notepad and the Calculator.

Opening a tool or project, however, produces a different result. When you open a tool, the Workbench starts that tool, but not on any particular project. The tool will then let you load any project on which you want to work. When you open a project, the Workbench knows that you need a tool to see what is inside that project. (That tool is known as the project's *default tool*; it's typically the tool you used to create the project.) The Workbench therefore starts that tool on the project, so that you can both see what's inside the project and, if you want, continue working on it.

The Workbench's knowledge of each project's default tool is just one of the many kinds of information it stores concerning every object. You can see such information by "selecting" (see above) that object and choosing Info from the Workbench menu. A full window of information will appear.

That window will show a few common facts about every object: its NAME, TYPE (disk, drawer, project, tool), a line called TOOL TYPES, and some type of STATUS. The TOOL TYPES line is merely a place that shows some special additional tools you can use to work with that object. The contents of the STATUS area vary with the type of object, as do the contents of the rest of the window.

Let's Get Down to Cases

For disks, the STATUS area shows whether the disk is "Read/Write" or "Read Only"—that is, whether you have set the disk's write-protect tab so that you can change that disk. An additional area displays some size information about the disk, including "Bytes per Block" (488 for floppies), "Number of Blocks" (the total number on the disk), "Number Used," and "Number Free." These last two measures tell you how

much disk space you are currently using and how much is available. Finally, a DEFAULT TOOL line shows you that the default tool for disks is the diskcopy program. (This line actually reads, "SYS: System/Diskcopy," which is the full CLI name of that program.)

Drawers do not have a default tool, but they do have a COMMENT line where you can enter a few words about why you created a drawer or what kinds of things you want to store in it. Drawers have the same STATUS options as tools and projects, but different ones than disks. The STATUS area for drawers, tools, and projects will show four options: ARCHIVED, READABLE, WRITEABLE, and DELETEABLE. They limit what you can do to any object (READABLE, WRITEABLE, DELETEABLE) and tell whether you have manually marked that object as recently backed up (ARCHIVED). Any option that is not true will be highlighted and will have NOT preceding it. The initial status for most objects will be NOT ARCHIVED, READABLE, WRITEABLE, DELETEABLE.

Not only can you merely read the information in this window, you can also change it. To protect an object from deletion, for example, click on DELETEABLE and it will change to NOT DELETEABLE. When you then click on SAVE in the lower-left corner, that change in status will be reflected the next time the object's Info is checked. To exit this screen without making any changes, click either on QUIT in the lower-right corner or on the close box in the window's upper-left corner.

Like drawers, tools and projects also have a COMMENT area in their information windows. In addition, they have a SIZE area that shows their size on disk in both bytes and disk blocks. Projects, like disks, also have a DEFAULT TOOL and a TOOL TYPES area. (There is also one other line, STACK, that lets you set the amount of stack memory that you want to use when you work on this project. Advanced users regularly alter the stack size for specific reasons.)

What's in a Name?

From time to time you will want to change an object's name. You cannot do this from the information window—it will not let you type in the NAME area—but you can easily take care of it from the Workbench itself. To change the name of any drawer, project, or tool, use the same procedure we discussed last month for changing the name of a disk. First, select the object and choose Rename from the Workbench menu. A string gadget containing the object's name will appear in the middle of your screen. Now edit the name into the form you want and hit the Return key. That's all there is to it.

Next month we'll take a look at some of the other basic operations that the Workbench lets you perform on disks, drawers, tools, and projects. If you have the time between now and then, there's no better way to learn how the Workbench works than to experiment with it. Good luck! ■

Mark L. Van Name and Bill Catchings are contributing editors to AmigaWorld. *Write to them at 10024 Sycamore Dr., Durham, NC 27703.*

Managing Memory in C

By John Foust

ALL PROGRAMMERS SHOULD learn proper memory etiquette. When a program needs memory, it should ask the operating system for it. When a program finishes with a piece of memory, it must return it for other programs to use. Dynamic memory allocation is easy and the most polite form of using memory. C handles this process via the Exec library functions AllocMem( ) and FreeMem( ), and its own functions malloc( ) and free( ).

With AllocMem( ) you can make an array called values, for example, adjustable according to an integer variable called num. The AllocMem( ) function has two arguments: the number of bytes of memory and the type of memory to get. (These flags, such as MEMF_PUBLIC, are listed in the exec/memory.h include file.) You could write a calculation program that uses AllocMem( ) as shown below:

```
int Calculate( num )
int num;
{
int success;
int *values;
ULONG val_sz;
  /* Find the size of the array, in bytes */
  val_sz=(ULONG) num * sizeof(int);
  /* Then ask for the memory */
  values=AllocMem(val_sz,MEMF_PUBLIC);
  if (values !=NULL) {
        success=TRUE;
    /* Calculations go here */
    FreeMem( values, val_sz );
  }
  else {
    success=FALSE;
  }
  return success;
}
```

Calculate( ) is careful about memory allocation. If the AllocMem( ) returns NULL, the program does not perform the calculations. If the memory is found, you can use the values variable as if it were a static array, in expressions such as:

```
values[5]=34 * values[4];
```

Instead of an int array, your array could be declared to contain anything, including structures. Just be sure to correctly calculate the size of the memory block, using the sizeof operator. For accuracy, perform the calculation as an unsigned long.

You will notice the program reflects a great concern for failure of AllocMem( ), no matter how tiny the amount of memory. Calculate( ) returns a value of TRUE or FALSE, depending on whether the memory could be allocated. Any function that calls Calculate( ) must check the return value to be sure that the calculation went smoothly. If it didn't, the program should warn the user that lack of memory caused an error. In more complex programs, an error in the lowest-level subroutine should percolate upwards until a higher-level function can recover from the error, and all functions along the way should clean up any memory they allocate.

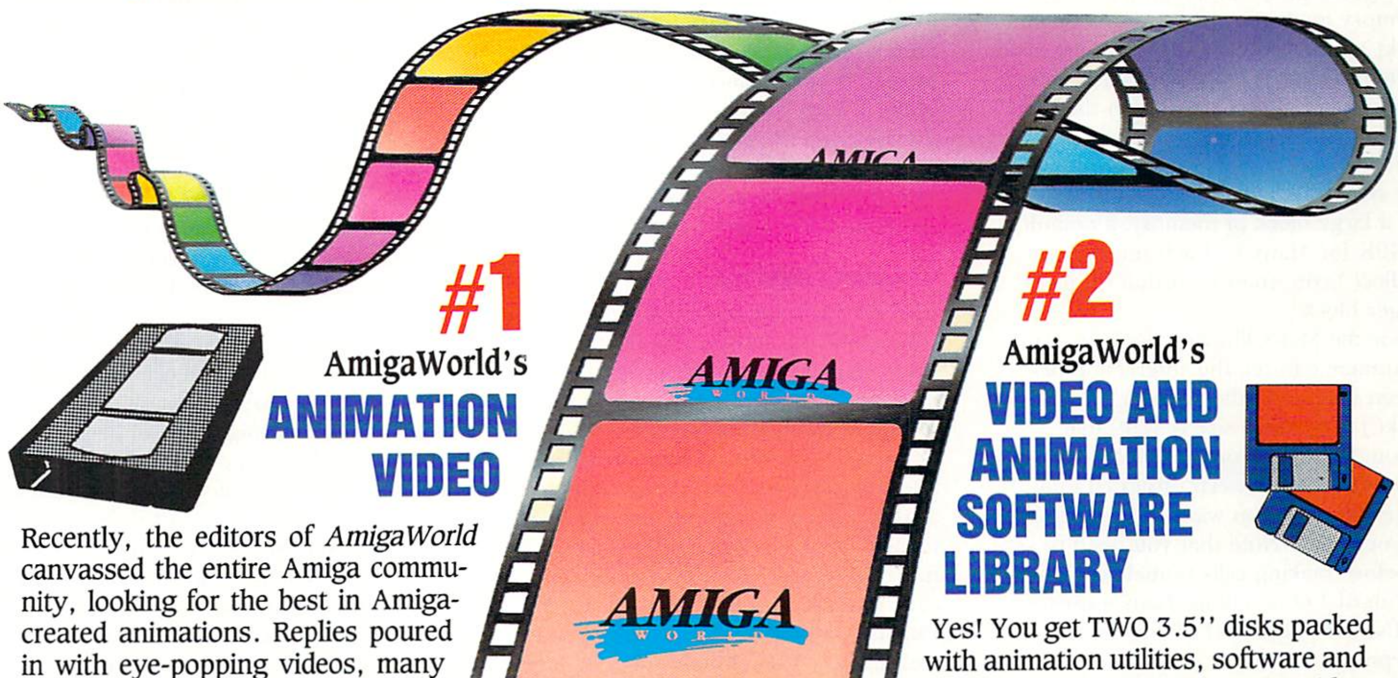
You return allocated memory to the system via the FreeMem( ) call. The previous example calls FreeMem( ) with the pointer to the memory and the memory's size. With FreeMem( ), the program must remember the size of the allocated block.

Executive or Resident

Every standard C library includes the resident functions malloc( ) and free( ), which are similar to the Exec library's AllocMem( ) and FreeMem( ). Both malloc( ) and free( ) are very portable, letting you compile the same program on many different machines. (You can easily translate the Calculate( ) example to use malloc( ).)

The malloc( ) and free( ) routines are written in terms of AllocMem( ) and FreeMem( ). In the Manx C compiler, a malloc( ) call for 32 bytes translates to a call to AllocMem( ) for 40 bytes. The system uses the extra memory to maintain a linked list that keeps track of allocated memory to free later. The file misc/malloc.c in the Manx C library source code shows this simple memory scheme. ►

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Instead of simply calling AllocMem( ) for each call to malloc, most C compilers manage their own lists of memory. These routines usually mimic low-level Unix memory management functions, such as sbrk( ). In Manx you must link the heapmem.o file for this type of management; Lattice offers it by default. On the first call to malloc( ), the function sbrk( ) is called to get memory from the operating system. It uses AllocMem( ) to ask for a large block of memory, a default of 40K for Manx C. Each subsequent malloc( ) consumes a portion of this larger block.

For the Manx libraries, look at sysio/heapmem.c to see this interaction between malloc( ), AllocMem( ), and sbrk( ). The block size is adustable through a _Heapsize variable, which you can declare as "extern unsigned long _Heapsize;" if you want to reset its value in your code. Note that you need to set it before making calls to malloc( ) or to standard I/O functions. Lattice uses _MNEED and _MSTEP for the same purpose.

In Manx, only one heap block is allocated. In Lattice, the routines manage a list of heap blocks. As a heap block of 40K is consumed, malloc( ) calls sbrk( ) to allocate another, minimizing the calls to AllocMem( ). Calls to free( ) mark portions of these blocks for re-use; FreeMem( ) is never called. Unlike FreeMem( ), free( ) needs only a pointer to the memory, not the size of the allocation. The size is stored within a structure that precedes the actual allocated memory, within the larger block.

CLEANING SERVICE

The standard C memory functions provide automatic cleanup. No matter what your source code says, C programs do not start at the top of the main( ) routine or end at the last line of main( ). C library code is executed both before and after the call to main( ). Your main( ) is actually called by a library function named _main( ). When your main( ) function returns (the program ends), control returns to _main( ). Within _main( ), all memory that was allocated with malloc( ) is automatically returned by a standard library function called exit( ), as a safegaurd against sloppy programming. During exit( ) cleanup, the C memory management routines run FreeMem( ) on all the large blocks of memory, essentially ignoring any information in the blocks.

This automatic cleanup does not eliminate your responsibility of freeing allocated memory. As soon as the program is finished with a piece of memory, you should return it via free( ) or FreeMem( ), so other programs can use it. You can use exit( ), however, to clean up after catastrophic errors. If something goes wrong, just call exit( ), and all malloc( ) memory is returned.

While malloc( ) and free( ) make some programming easier, you cannot use them for every AmigaDOS job. For example, graphics imagery must be placed in chip memory. Malloc( ) does not offer a way to specify chip or fast memory; you need AllocMem( ). Be careful: Mixing calls to malloc( ) and AllocMem( ) in the same program has a downside. The first call to malloc( ) allocates a large block of memory that is not returned until the program exits, even though

you may need only a portion of the chunk.

Without another layer of memory management like C's routines, AllocMem( ) has its faults, too. When many small AllocMem( )s are made by several programs at the same time, memory becomes fragmented. This means the system's free memory is broken into many relatively tiny pieces. Memory allocations (from different programs) become interleaved, and when one program exits, a honeycomb of free memory is left.

Even though a large total sum of free memory may be present, requests for large pieces of memory will fail, because the available pieces are so small. To avoid fragmentation, Exec provides routines called Allocate( ) and Deallocate( ), which make writing an intermediate layer of memory management easy.

Along the same line is the standard C function called realloc( ), which changes the size of a block of memory and copies data stored in the old block to the new block. You must supply realloc( ) with two arguments: a pointer to a piece of memory previously allocated via malloc( ) and a new size for the block of memory. The function returns a pointer to the new block. Be sure to use the return value to reassign any variables that point to this memory.

You can write your own version of realloc( ) in terms of AllocMem( ) and FreeMem( ). Because AllocMem( ) needs a memory type flag, and FreeMem( ) needs the size of the memory to deallocate, however, the function is more complicated than realloc( ). For example:

```
/* reallocmem.c */
#include "exec/types.h"
#include "exec/memory.h"
#define MIN(a,b)    ( (a)<(b) ? (a) : (b) )
void *ReAllocMem( ptr, newsize, oldsize, type )
void *ptr;
ULONG newsize, oldsize, type;
{
void *new_ptr;
ULONG copysize;
    /* Allocate a block of the new size */
    new_ptr=AllocMem( newsize, type );
    if (new_ptr !=NULL) {
    /* Copy old data to new block */
    copysize=MIN( newsize, oldsize );
    CopyMem( ptr, new_ptr, copysize );
    /* Free the old block */
    FreeMem( ptr, oldsize );
}
return new_ptr;
}
```

If the reallocation can't be made, then the old block remains as it was, and ReAllocMem( ) returns NULL. If the reallocation succeeds, the old block is automatically freed. Note that the effect of the MEMF_CLEAR flag is ignored in ReAllocMem( ), because any old data is copied to the new block. If the new block is larger, at least MEMF_CLEAR will guarantee that the extended part of the block will be set to zero. With ReAllocMem( ), it's easy to change the size of dynamic arrays during the execution of a program, leaving you no excuse for poor memory management. ■

John Foust is president of Syndesis Corporation and a contributor to a number of Amiga magazines. Write to him c/o AmigaWorld, *Editorial Dept., 80 Elm St., Peterborough, NH 03458.*



BATTLE SQUADRON

By Linda Barrett

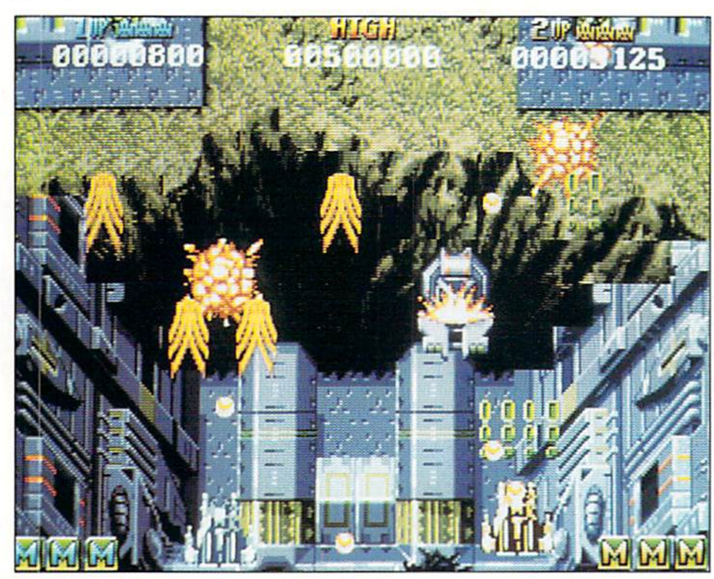
"ELIMINATE BARRAX lifeforms from the planet Terrainia's surface and subterranean emplacements" is your mission. It translates to "Keep shooting!" as you (and a friend if you wish) pilot your spaceship through this vertically-scrolling arcade gem.

While the Barrax appear to have a sizeable defense budget, you have only your flying skills (use the mouse, not the joystick, for the best control), three Nova Smart Bombs (which destroy everything within a half-screen radius of the ship), and your "ready" weapon. As in most shoot-'em-ups, destroy a fleet of fighters or a specific ship and they will jettison weapons capsules. Catch the M capsule and you gain a much-appreciated Nova bomb. Catch a colored capsule and you either upgrade your current weapon or convert to a new one: red Magnetic Torps, blue Anti-Matter Particle Beams, orange Magma Waves, or green Emerald Lasers. Tailor the weapon to the target: fighters, invisible ships, mother ships, and ground installations. Easy to say but harder to do with 25 weapons configurations and five levels.

You can easily tailor the game to your skills in the Options screen. Choose one, three, or five extra lives, your initial ready weapon, the maximum number of enemy bullets, their bullet speed, and the delay between enemy bullet firings. The minimum settings give you a chance to see trouble developing, while the maximums require instinctive movements. I found the defaults challenging enough for a start.

Battle Squadron's presentation can't be beat. The graphics are sharp and provide a good feeling of depth. The music and sound effects match the mood of the scenes well (sinister winds blow you down to the subterranean levels).

The game's most impressive element is speed, both of the on-screen action and your return to it after you die. You don't have to wait for gronking disk drives after you lose a ship (or all your ships) while you are fighting on the surface—just click the mouse button and go.



Rampant destruction to a great beat.

Stunning graphics, stirring music, and fast action: This is the kind of game the Amiga was meant for. Buy it! *($49.95, Innerprise, 128 Cockeysville Rd., Hunt Valley, MD 21030, 301/785-2266. No special requirements.)*

Crib Notes

By Peter Olafson

SNAKE-HATER INDIANA Jones would probably buy a pet boa before he would be able to complete the action version of Indiana Jones and the Last Crusade (Lucasfilm, $39.95). It's that hard.

• Some general advice on Level One: The knife-throwers are pretty unpredictable and crazy guys; it's hard to tell just when they'll let fly, and they're perched close enough to platform's edge to make dispatching them inconvenient at best. Try to slip between their throws. Do not stop on bridges. They'll collapse as you cross.

Watch your head: The ceilings are lower than they look or your jumps are higher. Either way, it's a good idea to jump from ropes at a point somewhat below the platform you're aiming for. If possible, stay down and avoid jumping with an enemy facing you, as they will typically choose this moment to shoot you. Keep an eye on those stalactites. Every ding you take counts.

Heading down and to the right, you'll eventually come to a long hanging rope, a torch, and a narrow rock passage. You can reach this apparently inaccessible area from above by rope, but you don't want to go there, even with a parent or adult guardian. It's a big red herring. The lone torch it holds is inadequate recompense for the time spent to obtain it, and two death traps make it a painful learning process. You'll want to go up the rope. But not right away. Wait until the stalactite falls before getting the torch. (Keep an ear open for those crunching sounds.) Don't be in a hurry to jump on the platform at rope top. Watch a bit to judge the relative speeds and positions of the climbers.

Continued on p. 74

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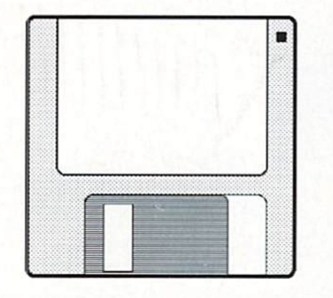
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SPACE QUEST III: THE PIRATES OF PESTULON

By Patrick Quaid

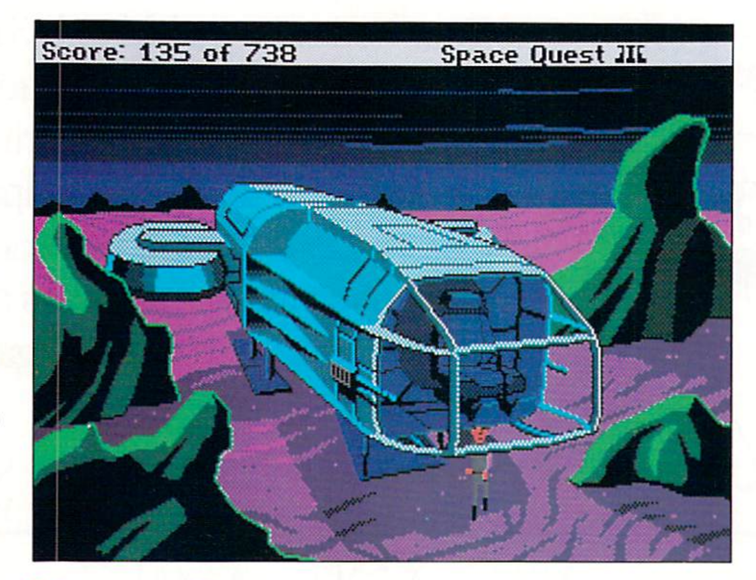
SOFTWARE PIRACY TAKES a nasty turn in Space Quest III. Instead of stealing programs, the pirates kidnap the programmers. As Roger Wilco, you must rescue the Two Guys From Andromeda, so they can continue writing a series of computer adventures about you.

With the keyboard or mouse, you control Roger as he rummages around full-screen, cleverly designed scenes. He can be hidden by foreground objects and can move in and out of shadows, creating a convincing three-dimensional effect. When the action gets too complex, you can type in commands. The interface works well because it focuses your attention on the puzzle rather than on the subtleties of the interface itself.

The puzzles, to be honest, are more fun than difficult. In fact, Space Quest III has more of the personality and peculiar logic of *The Hitchhiker's Guide to the Galaxy* than the Hitchhiker's game did. You get to know the strange characters and outrageous situations, and before you realize it you've finished the adventure (if you can avoid the quick death lurking around every corner). As the game progresses the situations become increasingly interesting, and the biggest surprises come in a hectic and exciting final sequence.

The graphics are obviously designed to be portable among computers, so although they look fine, they are not up to Amiga standards. The character animation, however, shows an uncommon personality and style. The background music changes with the scenes to enhance them. You'll miss it during silent sequences.

Space Quest III requires only 512K and one disk drive, but because almost every scene has to be read from disk, a hard disk helps load times keep pace with the game's tempo and humor. *($59.95, Sierra On-Line Inc., PO Box 485, Coarsegold, CA 93614, 209/683-4468. No special requirements.)*



Park your spaceship and have a look around.

INDIANA JONES AND THE LAST CRUSADE

By Peter Olafson

LUCASFILM HAS PULLED off a pair of cracking good games: an addictive action game and an ambitious animated adventure built around the movie *Indiana Jones and the Last Crusade*. Face it. You're going to be up late.

They're two very different sacks of snakes, so let's take them separately. The action game (produced by U.S. Gold for Lucasfilm, $39.95) is an above-average rendering of the classic platform game: climbing, jumping, ducking, punching. You guide the Stylishly Unshaven One through four difficult levels—a mine, a castle, a blimp, and the final ticklish run for the Holy Grail—while collecting torches and whips and punching out minions of evil. (See "Crib ►

from p. 66

You'll need to do a bit of rope switching yourself on the way up.

Now, how to get at the cross? It's too high to jump to and the rope's no use. The obvious route up entails much fruitless banging of the head against the ceiling. Aim a little higher. It's easy to miss it the first time. But watch that other climber. There is room above him on the rope.

Now you're in the clear for the run across the train-top. Don't stop running once you've triggered the train. Wait until any enemies have turned their backs before jumping. Next thing you know, you're in the castle. Congratulations. Now you help me.

• You've explored the catacombs beneath the library in Indy's companion graphic adventure (Lucasfilm, $49.95) and come up almost dry. Just that hook. You can't lift the slab (it's not important anyway), and the torch wouldn't move for the mud. You found everything available for the taking, but perhaps you could do something about the mud. There's plenty of water. You just need something to carry it in. You'll need to be more than diplomatic to get it. Use psychology.

• One of the toughest puzzles in Gold Rush! (Sierra On-Line, $39.95) is assembling points in New York. Where's that bank account number? Your friend at the bank will get it for you, but there's a better way. Soon, you'll be on a roll.

Another tough nut is finding your brother. The path to the section of the mine he's in doesn't look like a path. Do you recall a ladder that doesn't look like it's going anywhere?

• Winter leaguers in Earl Weaver Baseball (Electronic Arts, $49.95): The computer manager's recommended lineups can be weird. Earl doesn't appear to consider secondary positions. The way around it: You pick the players, and let the computer manager set the lineup with them.

• Shadowgate (Mindscape, $49.95) can seem as small as a toolshed at the beginning, even after you find that odd looking rock in the passage wall. ►

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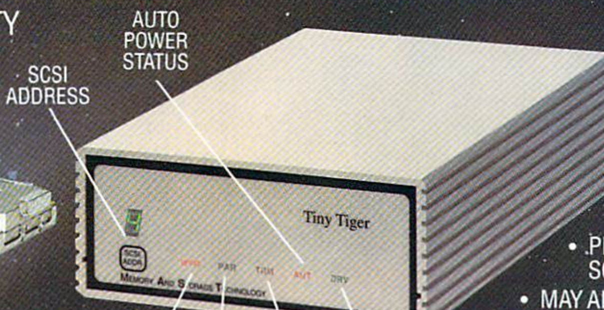
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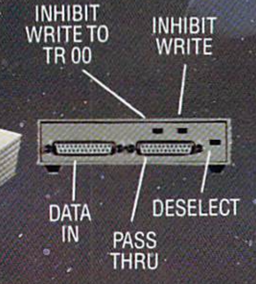


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Notes" for a walk-through of Level One.)

Every level has something distinctive, whether it's the air-sickness-inducing bobbing of the blimp, the bank-camera angle of the final level, or the cute animation of the rope climbers on the first. Indy and the backgrounds are very well drawn. The routes through the levels are devious. Play is just hard enough to infuriate and just easy enough to drag you back.

Some of the logistics, however, didn't quite work for me. For instance, a whip should be a near-inexhaustible resource, but here they are treated as expendable ammo. Beyond that, a less useful weapon would be difficult to find. The animation for cracking the whip is slow, meaning you can use them safely only when your opponent's back is turned. It's much easier to waste the whips on rocks and use your fists for people.

The action game could probably have existed without the movie. The real Indy game is the graphic adventure (from Lucasfilm itself, $49.95). Moving from the intro at Indy's college, to his father's ransacked apartment, Italian catacombs, a German-occupied castle, a zeppelin, and the trap and tricks of the Grail trials, the game has *lots* of puzzles. Be prepared, they get progressively nastier. The good news is that you don't have to do everything the way Indy did in the movie; I found as many as four potential solutions to one puzzle.



Tour the catacombs with Indiana Jones.

The standard Lucasfilm interface takes on a new and better look in Indiana Jones. You still click on verbs listed at the bottom of the screen and objects either appearing in the scene or listed below, and, voila, Indy or his father Henry try to do your bidding. Talking and fighting, however, are now part of strategy. (You'll have to learn to do one or the other in the castle.) In addition, the Look option provides more description, and the game uses overhead views when Indy explores corridors, which eliminates mapping.

All the usual quiet Lucasfilm humor, bright graphics, good sounds (slushy shoes), and attention to detail are here. (Take a look around your office, or at the bulletin board on the way out.) The animation, on the other hand, seems curiously slower than usual and the pace is less compelling. While you can move freely within each discrete area, you can't travel at will between them, making it feel like you are following the dead hand of the movie.

It's also somewhat less intimate in "feel." I didn't play this as obsessively as I played Zak MacCracken and the Alien Mindbenders or identify with Indy quite as readily as I did with Zak. That may owe to the game's popular origins, the rather removed perspective of the overhead views, or the small size of the Indy character compared to characters in the earlier games. He's really a little fellow, and actually kind of cute. *(Lucasfilm, distributed by Electronic Arts, 1820 Gateway Dr., San Mateo, CA 94404, 415/571-7171. Joystick required for the action game.)*

ROMANCE OF THE THREE KINGDOMS

By Timothy Trimble

BASED ON HISTORICAL accounts of China as it grew from chaos to three kingdoms to one nation, Romance of the Three Kingdoms is one of the best strategic simulations I have ever played.

Your main goal is to unite China under one ruler. With historically accurate personalities of 65 generals, you face a major challenge as you fight and negotiate your way to rulership. You can win states within China through battles, ►

(You *did* find the rock, right?) The way to the larger world is in the Mirror Room, and I don't mean the hole in the floor. You'll need something from the Dragon Room to break through.

• If you're wandering all over the mountain at the beginning of Journey (Infocom, $49.95), stop, restart, restore. It won't take you any place. You need the map from the shop in the village, and even that's not enough. Do I have to spell it out for you?

• The B power pills are the most devastating weapon in Ikari Warriors (Elite, $39.95). Grab them and avoid picking up anything but ammo—lovely for entertaining large crowds. Stand still while you're tossing them, however, as it's easy to advance into the blast radius while on the move.

Don't abandon your tank until it's out of fuel and smoking. Allow it to blow up in some judicious place (like next door to a bunker).

Don't bypass too many enemy soldiers, because they will reappear at the bottom of screen. He who advances too swiftly up the screen is sent home in a bag. Take it one step at a time.

Load up, move out, and we'll do it again next month. □

COMPANIES MENTIONED:

Electronic Arts, 1820 Gateway Dr., San Mateo, CA 94404, 415/571-7171.

Elite Systems Ltd., distributed in the U.S. by Keypunch Software, 1221 Pioneer Building, St. Paul, MN 55101, 612/292-1490.

Infocom, distributed by Mediagenic, 3885 Bohannon Dr., Menlo Park, CA 94025, 415/329-0800.

Lucasfilm, distributed by Electronic Arts, see address above.

Mindscape, 3444 Dundee Rd., Northbrook, IL 60062, 312/480-7667, 800/221-9884.

Sierra On-Line Inc., PO Box 485, Coarsegold, CA 93614, 209/683-4468.

diplomatic relations, and convincing other generals to join your forces. Keep the peasants happy by increasing land value through cultivation, building up flood prevention, and offering rice and gold. The last thing you need is to have your general killed by the masses. Plundering will drop loyalties but will increase the amount of gold, rice, and women that you have. You can give women as gifts to your generals, which is great for increasing their loyalties.

Should all else fail, attack the other states. The battle screen is a very colorful hex layout of the countryside, castles, rivers, and mountains. A nice table is also displayed, showing the statistics of the enemy. Battles allow one action per turn, either movement or combat. The mobility of the troops is dependent on the amount of training they have received, the amount of weaponry they are carrying, and the weather. Various types of attack are available, including an option that allows you to trick and trap the enemy. The intelligence of your commanding general has a lot to do with the success of this option. Watch the supply of rice for your hungry troops; it doesn't matter how much stronger you are than the enemy if your rice gets taken.

Overall, the game is a very well-done simulation with a fantastic manual. While I wish it relied on the mouse instead of the keyboard, I highly recommend Romance of the Three Kingdoms. *($69.95, Koei Corp., Suite 540, 1350 Bayshore Hwy., Burlingame, CA 94010. One megabyte required.)* ■



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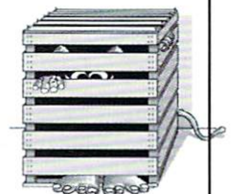
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from p. 18
board's synchronous design makes it more sensitive to system timing than the others, and the non-auto-configuring memory makes it a bit non-standard. Though there are jumper settings that help adapt the board to your particular system, I found one A2000 in which I could not make it work at all. The Hurricane 2800 should appeal primarily to those most concerned with getting the maximum performance for the minimum price.

GVP's is the original 68030 accelerator board for the Amiga, and a proven performer. Since its initial release, GVP has fixed a number of minor design flaws, so that the board is now functioning quite solidly. Also, while early versions of the Impact drive interface were reported to be fairly slow, the interface now ranks among the fastest available for the Amiga, with drive reads of up to 650 kilobytes per second. Finally, in its 33 MHz incarnation, the GVP board is clearly the fastest of all accelerators tested so far. Its biggest drawback is the design of its memory board, to which you can add 32-bit memory only in fairly expensive four-meg increments. Although the company insists that nybble-mode RAMs increase performance, my tests show the Impact board to be no faster than the Hurricane 2800 when run at the same clock speed, even with burst-mode memory access enabled. I would also prefer a SCSI interface. While the AT-bus interface is a cheap way to add a hard drive, it does not support devices such as removeable-media drives, tape backup units, and CD ROMs. Despite these reservations, GVP's board is an excellent choice. It can be configured to suit a variety of speed requirements and budgets, and even without its expensive memory, it provides performance rivaling 68020 accelerators with 32-bit memory.

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215/889-9411
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No special requirements.

MIDI Sample Wrench

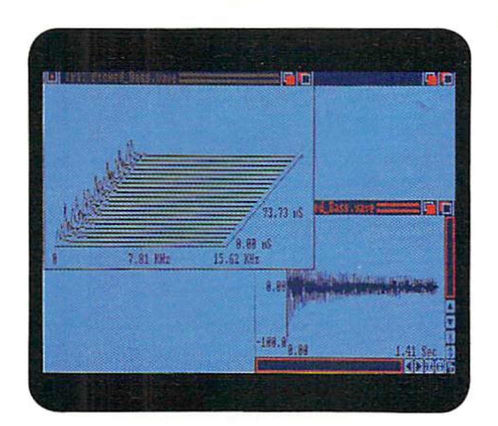
Tighten up your sound samples.

By Steve Quinzi

THE LIBRARY OF Amiga music software has been growing nicely for the past few years, except for one disappointing void—the area of sample editing. Sure, there are several good sample-capture and -edit programs for manipulating IFF sound files in the Amiga's internal audio domain, but outside of Sound Lab from Blank Software (which works only with the Ensoniq Mirage), there has been no Amiga software to support the multitude of professional-level sound samplers on the market.

All of this is changing now with the release of the MIDI Sample Wrench by dissidents software. With this program you can transfer waveforms to the Amiga from any sampler that supports the MMA Sample Dump Standard, a format set forth by the MIDI Manufacturers Association for the transfer of sound samples through MIDI. Once loaded into the Wrench, samples can be modified extensively through a number of very sophisticated editing features with high-fidelity 16-bit format, and stored in dissidents' own MSW1 format.

The package includes a program disk



Catch a wave in a window.

and a disk of sampled sounds. There are some very useful utilities thrown in, such as the 8SVX-to-MSW1 and MSW1-to-8SVX utilities, which convert 8SVX (IFF) samples to MSW1 format and vice versa; the Talk 12 and Talk 16 functions, which exchange sounds directly between the Amiga disk and a sampler without opening Wrench; Play MSW1, a tool that takes sounds directly from disk and plays them from the Amiga's keyboard; and Play Remote, which triggers a remote sampler from the Amiga's keyboard. Another utility allows for communication with the Akai S700, S900, and S950 samplers, which interpret the Sample Dump Standard a bit differently.

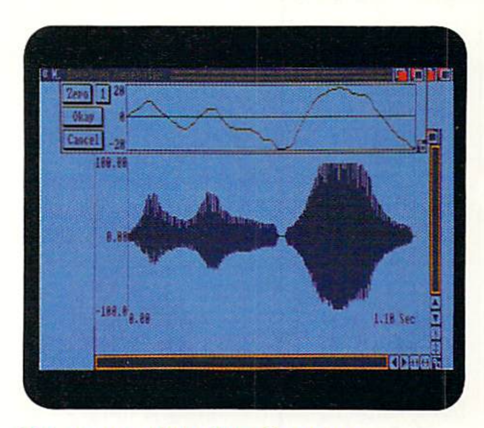
The program's copy-protection scheme asks you to type in a randomly selected word from the manual. If you type the wrong word or misspell it, you are quickly returned to the Workbench screen (a non-copy-protected disk is available for an additional $30). The program requires 512K of RAM to run, but one meg is recommended. I tried running Wrench without expansion RAM and found it so limiting that it was practically useless.

MIDI Sample Wrench opens onto an empty screen with a menu bar. From the Project menu you can open edit windows one through three; the Setup menu offers options to vary screen color, define backups (internal, external disk, or none), and to choose between a 200- or 400-line display; the MIDI menu lets you specify the sampler you are using and to initiate sample dumps between the Amiga and the sampler.

In the Windows

Each of the three edit windows sports a different color and a different set of controls. All can be open at the same time. Each is topped off by a color-matched menu bar containing options pertinent only to that window. The Wrench is not a sample-capture program, but you can get a waveform into an edit window either by loading it from disk or by dumping it from a sampler.

Once a waveform is in a window you can scrutinize it pretty thoroughly by magnifying, zooming in and out, scrolling left, right, up, and down, or by resizing the window to get a bigger picture. The CTRL-M and CTRL-L key combinations put you into Play mode, allowing you to hear the waveform either through a MIDI keyboard or the Amiga keyboard, using the Amiga's internal sound chip. Although the fidelity of the eight-bit Amiga audio will be noticeably lower than when playing from your 12- or 16-bit sampler, you will probably end up using the Amiga sounds to check your edits—waiting till the end to send the sound back to the sampler—as a transfer can take minutes. (The slow transmission rate is inherent in MIDI.)



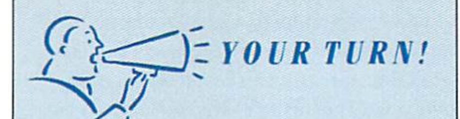
Not your usual Envelope Generator.

Dumps (transfers) are initiated by selecting either Send or Receive from the MIDI menu. Data transfer is made possible by the Wrench's library file, which contains the information necessary for ►

the program to communicate with samplers. There are two libraries to choose from: one for 12- and another for 16-bit samplers. I tested MIDI Sample Wrench with a Yamaha TX16W and an Akai S1000, and found that dumps to and from the Yamaha came off without a hitch using the 12-bit library. The S1000, however, required that dumps go through the Talk 16 utility, thanks to Akai's improvisation on the Sample Dump Standard. Though the sound was transferred flawlessly, having to use the utility rather than the Wrench library proved a bit cumbersome.

PROCESSED SIGNALS

The program offers an array of very powerful DSP (digital signal processing) features in its Functions menu: The Gain and Scale to Full options let you vary the gain (level) of a sampled sound. Gain increases or decreases the level in .1 dB increments up to 30 dB, while Scale to Full automatically increases gain to the highest level available without clipping. The Reverse function plays sound backward, while Invert performs phase reversal, flipping the wave upside down. Combine Samples mixes waves from any of the three edit windows: You can define an offset so that one of the waves starts before or after another, and you can set their relative levels. A wave can be combined with itself in this way for a flanging effect. DC Offset attempts to compensate for direct current (a square wave), which may have been imparted during the sampling process, by adding an equal but opposite amount of DC to cancel out whatever is there.



MIDI Sample Wrench is very flexible and does everything that an Amiga sample editor should do. The tech support person called me right back and was very informative.

—Doug Travins
Schenectady, NY

The Digital EQ section is great. It has a parametric EQ with a range adjustable from .1 to 3 octaves and a center frequency adjustable from 5 Hz to 95% of the Nyquist frequency (half the sampling rate). It also has bass and treble shelving with a definable break point. Both EQs can be applied for either a boost or cut of 20 decibels (dB). In addition, there are high- and low-pass filters with a definable cut-off frequency. You can select from three filter orders (slopes): first (a six-dB-per-octave roll-off), second (12 dB per octave), or fifth (40 dB). While a 40-dB roll-off may seem severe, it is handy for preventing aliasing when transposing or resampling. I am surprised that this otherwise-complete section does not include a 24-dB-per-octave or 4-pole filter, as 24 dB is such a common slope.

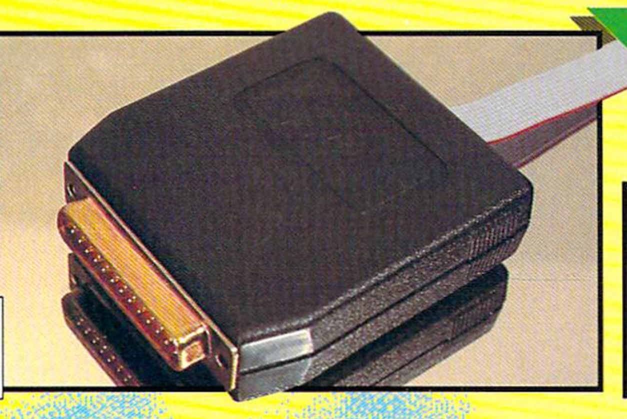
ENVELOPE, PLEASE

The Envelope Generator turned out to be different than I had expected. Not a traditional envelope generator that applies an overall envelope to an existing gain shape, the MIDI Sample Wrench version is like a graphic gain shaper with which you can draw (via mouse) a specific gain characteristic for a wave or ►

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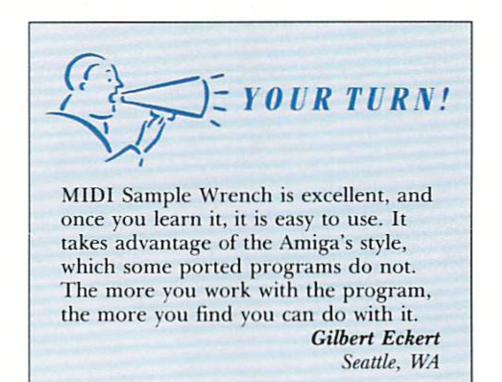
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CCT 1

part of a wave. The Envelope Generator window opens over the edit window, lining up precisely with the left edge. The envelope affects only that part of the wave in view. The Envelope Generator window has a center line representing zero dB and offers three ranges of severity: +/− 10, +/− 20, and +/− 40 dB of gain. Once you draw the envelope in the window freehand, the program goes to work calculating and then displays the new shape in the wave edit window.

The Fs Transposition option can resample to different sampling rates, change the sample-playback rate, and transpose waves to different pitches. I think pitch transposition could have been better implemented; as it is, you must calculate the frequency at which to resample, then bring the wave back to its original playback rate. Maybe I'm lazy, but I would like to see the program perform the calculations.

A Compression facility is available for leveling the dynamic range of a sound. The Wrench's compressor is much like a hardware unit. The Treshhold, or level at which compression starts, is adjustable from 0 dB (which in this case is calibrated to represent maximum level) to −60 dB. The Ratio—degree of compression—is adjustable from 10:1 to .2:1.



MIDI Sample Wrench is excellent, and once you learn it, it is easy to use. It takes advantage of the Amiga's style, which some ported programs do not. The more you work with the program, the more you find you can do with it.

Gilbert Eckert
Seattle, WA

Note that the fractional ratio will result in expansion and must be used with caution as this function has no safeguard against clipping. You can adjust Attack, or length of time before compression starts, from .01 to 20 milliseconds, and Release, the length of time compression lasts, from .01 to two seconds.

When you select the Transfer function, a window opens with a graph, the x axis representing input (the wave shape before transfer) and the y axis representing output (after transfer). A straight line plotted at a 45-degree angle through the intersection of the axes (unity) results in no change to the sound, as input in this case is on a one-to-one correspondence with output. Changing the line with one of the preset shapes or by drawing with the mouse, however, alters output. What effect does this have? You can never tell. Think of it as a quick and easy way to add weirdness to a wave.

FFT, or Fast Fourier Transform, calculates the harmonic content of a wave as it changes in time, and presents it as a psuedo 3-D graph on screen. Frequency is plotted along the horizontal, amplitude on the vertical, and time on the diagonal of the graph. Six resolutions are available from 1024 point to 32 point, with 1024 having the highest frequency resolution (and taking the longest to calculate) and 32 point having the greater time resolution. According to the manual this function is not accurate enough to be used as a serious analysis tool and is ►

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meant only to serve as a guide. I like it just the same.

Marked for Effect

Looping is the meat and potatoes of any sample editor, and the Wrench is no exception. You make a loop by placing markers—either using the mouse or by typing in sample numbers—at the ends of the section that you want to affect. To facilitate the looping process there is a zero crossing finder and a Cross Fade Looping option that mixes material from the end of the loop with that at the beginning, or some of the waveform from the start of the loop with the end, or both. View Markers lets you see the loop points, and View Loops draws a horizontal line below the two markers to indicate a sustain loop and above to indicate a release loop.

Markers can serve not only to set off loops, but also to help keep your place when zooming and so on. The View Markers menu presents the six marker options and takes you directly to the one selected without scrolling.

The Clips menu is home to the Cut, Copy, and Paste functions. Before you can use these options you must define an area of the wave—with the mouse or markers—as a Clip. The Wrench can accommodate six clips on a clipboard. You can name each of these individually, and play them from the clipboard itself. You can also cut and paste them among the three editing windows, and if you find that your splices look a bit sloppy, you can smooth them out with Free Hand Draw, a function that lets you redraw waveforms with the mouse.

Not only is MIDI Sample Wrench a well-written and professional program, in some ways it is a milestone product for the Amiga. Unfortunately, though, not many samplers support the Sample Dump Standard, and some of these do not adhere strictly to the MMA specifications. So if the Wrench is to succeed, it must support a variety of samplers—SDS implemented or not. Dissidents says that support for the Casio FZ1 and the Ensoniq EPS is coming soon. That's a good start, but Roland and Korg owners are still out in the cold.

In any event, if you own a supported sampler, MIDI Sample Wrench is a must. It is the most powerful Amiga sample editor of any kind I have seen. You may consider using the Wrench just to edit Amiga sounds—a little expensive for this purpose maybe, but the DSP functions alone could prove worth it.

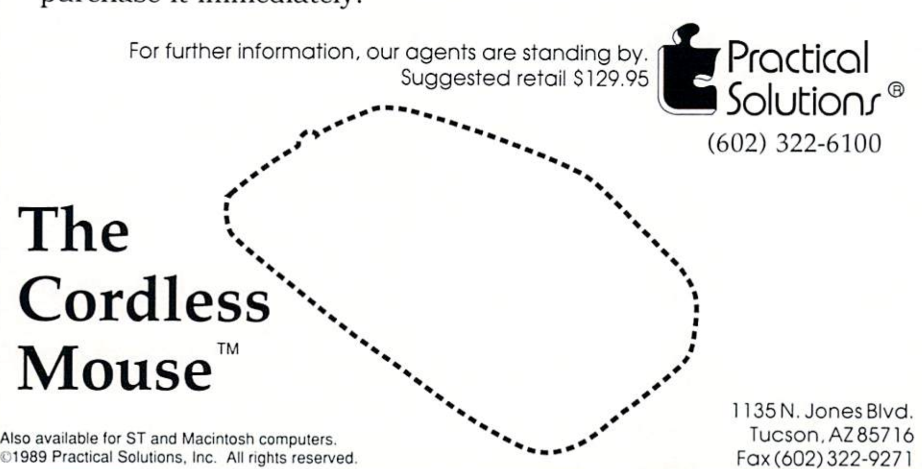
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By Chris Dickman

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the first serious attempt to address a problem that plagues such programs on all computer platforms—that is, the need to create as exact a match as possible between the screen and printed page.

Differing resolutions and imaging models of display and output devices have made this problem the Achilles heel of graphics-based electronic publishing. For those using PostScript printers, the NeXT computer has come closest to achieving this elusive goal by driving the screen with Display PostScript, thereby using the same imaging model for both screen and printer. Adobe Systems released a scaled-down version of Display PostScript last fall for Mac and later for PCs called Adobe Type Manager. ATM's vastly improved screen fonts can also be used for output to non-PostScript devices, such as dot-matrix printers. The resulting print quality of medium- to large-size fonts is far better, although small fonts print much the same.

The Amiga Solution

For us, the problem of matching the screen and the page has been exacerbated by the unwillingness of mainstream software developers, such as Adobe, to develop Amiga publishing solutions. Thankfully, Gold Disk has responded with a solution that may extend its domination of high-end Amiga publishing by including more dot-matix printer owners. The company has licensed fonts and font-scaling technology from Compugraphic, a manufacturer of traditional typesetting equipment and PostScript imagesetters.

Compugraphic versions of the venerable Times Roman and Helvetica are included with Professional Page 1.3, and more type styles are available from Gold Disk ($99.95 for 35 fonts). You can still use standard Amiga bitmap fonts and even mix them with Compugraphic fonts in a publication, but the result, as always, is jagged-edged characters.

When you select a Compugraphic face and start typing, a separate program begins scaling the fonts for screen display for the current type face, size, and page magnification. The process can take a while and the resulting scaled characters stick around, taking up memory and/or disk space. Professional Page simply isn't viable on a system with one megabyte of memory. I found that it crashed and provided an out-of-memory error after creating only four lines of text in two Compugraphic faces and sizes on a single-meg system. A requester lets you allocate various combinations of disk or RAM space for holding constructed fonts, but you will need at least two megs and a hard disk to do useful work.

The same slow font-scaling process occurs when you print to a dot-matrix printer. While the cache you create in a session is automatically saved to disk when you quit, a cache-editing program has been included to create custom sets of permanent screen and printer fonts.

Are the fuss and hardware requirements worth it? The Compugraphic screen fonts are definitely the best I've seen in the Amiga environment, and even rival those of Adobe Type Manager at large point sizes. On dot-matrix printers, Compugraphic type will be good enough for many users down to 10 points, but it's cleaner at larger sizes. I take issue, however, with Gold Disk's ►

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claim that "even a dot-matrix printer will produce professional-looking typeset documents, making a PostScript laser printer unnecessary." No program can produce professional-looking typeset documents on a dot-matrix printer. Period. If you need professional quality, get a laser or use a service bureau.

And what of the PostScript environment? PostScript versions are included with the Compugraphic fonts, so you will not only get better screen representation, but be able to use the downloadable font at print time. Gold Disk has said it will be supplying a library of Compugraphic fonts in the near future—good news for those of us starved for PostScript fonts in Amiga format.

What's More

Beyond the addition of Compugraphic fonts, Professional Page 1.3 has enough improvements that most publishers would have called it 2.0. Support has been added for the QMS ColorScript color PostScript printer and color-separation abilities are enhanced with the addition of undercolor removal and gray-component replacement. A "wireframe" mode for displaying vector graphics speeds up screen redisplay, as does the new ability to display text in "greeked" (scribbled) fashion. If you use Gold Disk's Transcript word processor, you can now display that program in a window and quickly move text back and forth between it and Professional Page documents. This makes major editing much easier.

Graphics import has been improved in a number of ways, notably with the ability to import bitmaps limited in size only by memory. Professional Page 1.3 automatically scales bitmapped images to fit the box created for them. Also, you can now import and print EPS (Encapsulated PostScript) files created with Professional Draw (Gold Disk) or with Macintosh and IBM PC structured-drawing programs such as Adobe Illustrator, complete with color information.

This is not to say that Professional Page 1.3 is without limitations. It cannot rotate text, for example, or display facing pages, automatically wrap text around objects, or use style tags to format text. Still, no other Amiga program comes close to dislodging Professional Page from its position as the preeminent professional-level page-makeup program. This version just lengthens the gap.

Professional Page 1.3
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1. Sculpt-to-Targa at a 12 × 10 aspect ratio.

face, or exchange and interchange information, with other "professional" computers. Certainly the Amiga is one of the front-runners in the computer graphics arena, but computer artists want to know how well the Amiga interfaces with PCs and Macintoshes.

ImageLink by Active Circuits can offer the Amiga that interfacing ability. ImageLink is a format-conversion program that transforms most Amiga 21- and 24-bit pictures into the 8-, 16-, 24-, and 32-bit formats currently in use on Macs and PCs. ImageLink also converts files between different Amiga 24-bit formats, and can create standard IFF pictures from 24-bit files. Finally, ImageLink allows Bridgeboard users to render Sculpt (Byte by Byte) 24-bit RGB files directly to an AT&T Targa graphics board installed on the PC side of an Amiga 2000.

High-End Video

In this context, 24-bit video refers to the number of bits it takes to represent the number of possible colors in a picture. Five bits allows the standard Amiga 32 color modes, eight bits gives 256 colors, and with 24 bits, any pixel is capable of displaying any one of over 16 million colors. While the Amiga by itself cannot display a 24-bit picture, there are a number of boards you can hook up to the Amiga that do. Among these are Mimetics' Frame Buffer, Impulse's VD-1, and for Bridgeboard owners, AT&T's family of Targa boards. Unfortunately, because these boards will display only a single frame of video at a time, doing animation with them requires a single-frame controller and a capable video deck. Further, the least expensive of these boards goes for around $800, with Targa boards starting at around $2000. They are certainly for the serious user.



2. Targa-to-HAM at 320 × 480—no cropping.

ImageLink too, is priced for the professional user, but it fills some critical gaps that graphic artists and video producers are keenly aware of. Besides rendering directly to Targa boards (with the Sculpt-direct and Targa-direct modules), ImageLink does file conversions between the following formats: IFF (including ►

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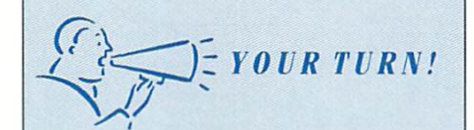
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ASDG's 24-bit IFF spec), Sculpt-Animate RGB, NewTek's Digi-View 21 bit, Macintosh PICT, TargaFile, and Impulse's Turbo Silver RGBN format. Active Circuits promises future modules to interchange GIF, Sun Rasterfile, and TIFF files, and as we go to press, the company has released a module to read Caligari Broadcast files and to read and write 8-bitplane IFF files.

Making Changes

Users of Interchange (Syndesis) will be right at home with ImageLink's interface. Double clicking on the ImageLink icon brings up a requester that lets you choose between the To and From formats installed. As a VD-1 user, I was immediately disappointed to find that while ImageLink reads Impulse's RGBN format, it cannot write it. (Fortunately, the VD-1 also displays Sculpt RGB files). Once you select formats, bitplanes, and file names, ImageLink displays what it thinks is the pixel width and height, and pixel ratio, of your file, and offers you the choice of scaling the image. I was not able to get the scaling mechanism—a vital feature—to work. Sculpt-Animate defaults to an RGB image size of 640 × 480 pixels, while many Targa boards expect image sizes of 512 × 482. After rendering a file



ImageLink is a wonderful and amazingly powerful product. You can render from Sculpt and Turbo Silver right from it. It doesn't seem to take any longer than normal to render, and you get great quality. It is the only 24-bit solution I would go with.

—*Richard Payne*
San Francisco, CA

with Sculpt using the defaults, I called Active Circuits when my Targa conversions would not load. They told me I had to re-render my Sculpt image at 512 × 482. I did, but had to call again to find out why my images came out squashed. They told me to try re-rendering with a pixel ratio of 12 by 10. This time the image rendered properly, and the ImageLink conversion looked fabulous on the Targa board. I am disappointed, though, that the manual does not offer this information and that ImageLink's scaling features did not fix the conversions after rendering the first time.

Next, I tried converting from Targa to Sculpt RGB format. The resulting picture was squashed as well, and I had no way of fixing it, as the software I used to generate the Targa file did not offer pixel-ratio adjustments. I then converted a Sculpt RGB file and a Targa file to IFF HAM format. Both these conversions looked good; I was pleasantly surprised by the results. A Digi-View 21-bit file converted to Sculpt and HAM with no problems, and a Turbo Silver file also converted flawlessly. In doing conversions to Macintosh PICT format, I discovered that the PICT file was improperly created. This one is important, because there are a number of programs that will convert PICT files to PostScript for high resolution output for print. After a few more calls to Active Circuits, they admitted that there was a bug in the eariler version of the PICT ►



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converter and offered to upload me a corrected version, which worked fine.

I was unable to give the Targa Direct and Sculpt Direct modules a complete workout, as I do not own a Targa board. I have an XT Bridgeboard, and although the 16-bit Targa board will work with it, real-time paint programs, like TIPPS and Lumena run too slow to use on an XT. On an AT Bridgeboard, these programs would work fine. But with the number of Amiga-specific 24-bit boards now and soon to be available, and considering a 24-bit Targa board is more than twice the price of most of them (my local AT&T TrueVision dealer quoted me a price of $3000), I cannot recommend buying a Targa board without buying the AT Bridgeboard. One advantage of Targa boards is that they offer RGB outputs, but putting this signal onto videotape requires an RGB-to-NTSC composite video converter (read: more dollars), and incidentally, TIPPS goes for $1500.

ImageLink fills a hole in the professional graphics community. It has a straightforward, simple-to-understand interface, and the fact that it supports Targa, PICT, and soon, TIFF formats, helps bring legitimacy to the Amiga as a low cost, high-end graphics producer. Further, support for ASDG's 24-bit IFF format not only gives it a promising future, but makes it a must-buy for Professional ScanLab (ASDG) owners wishing to convert Sculpt and Digi-View files for publication. ImageLink's ARexx interface allows it to be part of a more complex environment or a turnkey system. The current incarnation of this program is in many ways incomplete, however. Lack of image- and pixel-ratio scaling and inadequate documentation are critical drawbacks of an otherwise superb program.

ImageLink
Active Circuits Inc.
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Manasquan, NJ 08736
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No special requirements. □



BACKTALK

CANDID RESPONSES TO *AMIGAWORLD* REVIEWS

City Desk 2.0 (MicroSearch)

Regarding the City Desk 2.0 review by Nancy Devitt in your December '89 issue (p. 121), Font selection and formatting is not accomplished solely via embedded commands; we also provide a text attributes tool in an on-screen toolbox. The article faults City Desk's dot-matrix font support, yet this is one of the program's strongest features and sets it apart from its competitors. While the reviewer says there are no instructions for manual installation of the program on a hard drive when running ►

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B A C K T A L K c o n t i n u e d

from a shell, the HDInstall.readme section clearly states you should execute HDInstall from a "virgin CLI with no commands aliased, no commands in the Resident list, and the path reset."

—***Tony Johnson***
MicroSearch

Embedded commands are a reflection of City Desk 2.0's power. I think the intention was to make an easy transition from old-style printers to computerized typesetting. As far as color capability goes, not everyone has need of it—just look at IBM and Apple. I agree with the page-size problem, but lack of a WYSIWYG display is a problem only because everyone thinks it has to be there. City Desk 2.0 turns out high-quality work on common, inexpensive print equipment.

—***Patrick Smith***
Mt. Airy, NC

I Beta tested City Desk 2.0 with a 24-pin dot-matrix printer and continue to get excellent results. This program prints regular Amiga fonts without jaggies at the printer's best resolution, not just at 72 dpi like some other programs. Embedded commands give you great typographical control, and the Preview display shows clearly how the printed bitmapped fonts will appear. Finely detailed bitmapped fonts are large, therefore additional memory will help prevent system crashing. I have had success multitasking City Desk with either WordPerfect (WordPerfect) or DeluxePaint III (Electronic Arts) on a 2.5-meg A1000.

—***Michael B. Safer***
Albany, CA

It is true that City Desk 2.0 provides a Text Options tool for setting default attributes and attributes of selected new *text (incoming from either a word processor or the text editor). Detailed manipulation of text already loaded into City Desk, however, must be done in the editor. I believe embedded commands should be a feature of every page layout program, but not the only or dominant option. If the Amiga is to compete in the real world, its software must perform as intuitively as the Mac's Pagemaker (Aldus), for example. Also, other Amiga programs offer outline fonts that can be resized and manipulated with ease, and that take advantage of the capabilities of both dot matrix and HP compatible printers. Concerning hard-drive installation instructions, I do not think the read.me file phrase quoted is intelligible to the average user. Plus, it is simpler to assign SYS: to the appropriate drive. City Desk is the second most expensive Amiga desktop publishing program, and as such should offer performance second only to Gold Disk's Professional Page. I don't believe it does.*

—***Nancy Devitt*** ■

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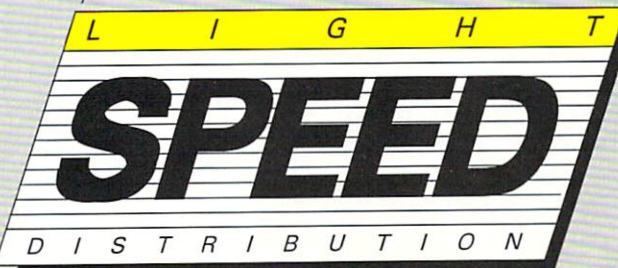
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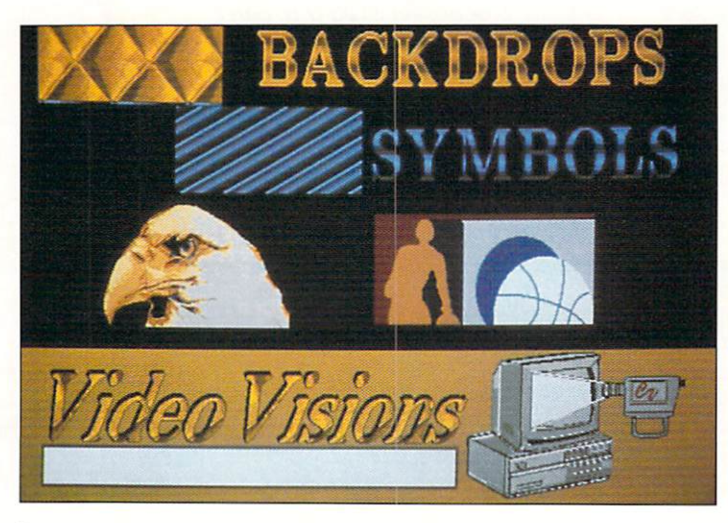
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Compiled by Jan Jackson

Here Comes the Bride

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One More Time

Editor's note: the following is a correction to an item that appeared in January 1990's What's New. The **AX-S Expansion System** offers a variety of expansion options—not just A2000-style cards in an epansion chassis. AX-S lets you utilize a variety of PC-style boards as well as serial port expanders, controllers, modems, handscanners, FAX boards, tape backups, and more. Details and pricing may be obtained from ***Spirit Technology*** (220 W. 2950 S., Salt Lake City, UT 84115, 801/485-4233). *RS# 501.*

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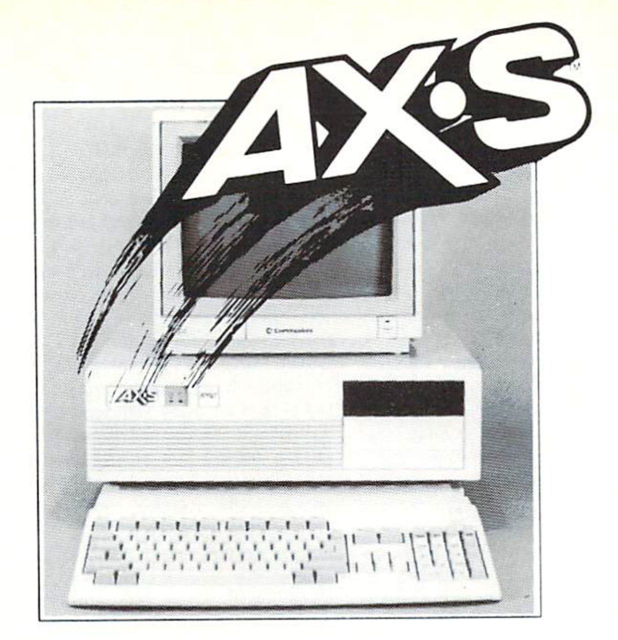
And Then Some

TELEGRAPHICS INTERNATIONAL attempts to demystify A2000 hard-disk installation and setup processes for the uninitiated with the *Amiga Hard Drives: The Complete Guide* ($49.95) videotape. The guide highlights Great Valley Products' A2000-2/2 and Commodore's A2091. Topics covered include autobooting, partitioning, formatting, and interleave factors. Get the hard-core facts from Telegraphics (605 Dock St., Wilmington, NC 28411, 919/762-8028). *RS# 509.*

The updated *Pagesetter II* ($149.95) desktop-publishing system helps you print newsletters, flyers, resumes, advertisements, and brochures on any Preferences-supported graphics printer. Pagesetter II uses AGFA Compugraphic fonts and lets you import text from any Amiga word processor. You can also import IFF bitmap graphics or structured graphics from Gold Disk's Professional Draw and then resize, scale, crop, or move them as necessary. The drawing tools included let you create rectangles, ellipses, and polygons. Gold Disk (PO Box 789, Streetsville, Mississauga, Ontario, Canada L5M 2C2, 800/387-8192, 416/828-0913) will get you started. *RS# 504.*

Tinkerers, grab your soldering iron and roll up your sleeves—now you can build your own MIDI interface. Alba Computer Ltd.'s (15 Western Broom Garden, Edinburgh, Scotland, EH12 7RA, 031-316-4171) *MIDI Interface Kit* (£24.95) comes with a full complement of resistors, capacitors, DIN sockets, D-connectors, and cables to assemble a ready-to-use unit socketed for MIDI in, out, and thru. *RS# 505.*

Electronic Arts has cut the ribbons on its latest offering to desktop videographers, *DeluxeVideo III* ($149.95). This version claims to fully integrate sound effects, music, and MIDI for audio-visual presentations. Just click on DeluxeVideo III's interactive objects and activate other video sequences, music, or any other data the program manipulates. The package supports Amiga resolution modes, SuperBitMaps, high-speed animation, MIDI output, and IFF-standard audio files, and you can use Anims or AnimBrushes created in DeluxePaint III (also EA) and add them to your production. The program controls external devices such as MIDI equipment, genlocks, and single-frame VCRs. Owners of the original DeluxeVideo ►



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irit Technology will make available the Copywrited "AX-S™ Resource Library" sk to enable developers to write drivers between Amiga and PC/XT-AT hardware evices. For more information on AX-S™ look for Spirit AXS.DOC on Compuserve, eople Link and Gene Networks. To order the AX-S™ Resource Library disk call or ite us at Spirit.

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Circle 19 on Reader Service card.

version can upgrade by sending their manual's front cover and $49.95 to Electronic Arts (1820 Gateway Dr. San Mateo, CA 94404, 415/571-7171, 800/245-4225). *RS# 506.*

Compute! Publications jumps on the video bandwagon with the release of *Amiga Desktop Video* ($21.95), a book devoted to exploring the fundamentals of the subject of the video. The volume includes techniques, a glossary, and a list of manufacturers and countries with the same video standards as the US. Chilton Book Company (Radnor, PA 19089, 215/964-4000, 800/345-1214) offers the book. *RS# 507.*

Also now off the press are Addison-Wesley's (Reading, MA 01867, 617/944-3700) remaining two volumes of the Amiga technical reference series: *Amiga ROM Kernel Reference Manual: Libaries and Devices* ($34.95) and *Amiga Hardware Reference Manual* ($24.95). *RS# 508.*

Maverick Software Inc.'s (4018 W. 65th St., Minneapolis, MN 55435, 612/926-0302) *Discovery Series* of educational programs covers a variety of subjects: alphabet, numbers, math, U.S. history & geography, and chemistry at $19.95 each. *RS# 510.*

Watch Fred the alien dance while you play *Fun Keys*, the program that turns your Amiga's keyboard into an electronic organ. As you play different sounds and instruments, Fun Keys accompanies you with one of 18 different background beats from funk to salsa. Call MicroSearch, 9896 S.W. Freeway, Houston, TX 77074, 713/988-2819. *RS# 511.*

Popular text editor *CygnusEd Professional Version 2.0* ($99.50) emerged from the inner sanctum at ASDG (925 Stewart St., Madison, WI 53713, 608/273-6585) with new tricks. Unlimited undo and redo commands and Turbo Search and Replace modes streamline executions. Other enhancements include more and better macros, expanded ARexx support, alternate screen fonts for hi-res, and a Modula-2 support feature to assist in locating and correcting errors. ASDG is making the program's file-requester library available to other developers as an invitation to help standardize user interfaces. Original version owners can upgrade by sending their program disk plus $25 to ASDG. *RS# 512.*

A professional version of Devpac2, an assembly-language programming environment, is available from MichTron (576 S. Telegraph, Pontiac, MI 48053, 313/334-5700; after 4/1/90: 3285 Lapeer Rd., W. Auburn Hills, MI 48075, 313/377-8998). *Devpac Development* is source-code compatible with Devpac2, assembles to seven different output-file formats, allows for direct remote assembly and cross debugging, and includes a multi-format linker. Contact MichTron for an extended list of features.

Microdeal's *Master Sound* sampler lets you record and manipulate voices, music, and effects. You can play up to 20 samples in sequence and, with the included demo program, synchronize sound with IFF picture displays. *RS# 514.*

In *Starflight*, ($49.95), rapport with alien races can mean the difference between colonization or warfare in deep space. Receive your departure coordinates from Electronic Arts (1820 Gateway Dr., San Mateo, CA 94404, 415/571-7171) and explore the final frontier in this futuristic role-playing adventure. Train and command your crew of humans, androids, insect-like Velox, reptilian Thrynn, and Elowan, a race of intellegent plants. By gathering minerals and ancient artifacts, you learn the secrets of alien missions. Receive you departure coordinants from Electronic Arts (1820 Gateway Dr., San Mateo, CA 94404, 415/571-7171). *RS# 515.*

Get a look at 3-D evil bats, rats, spiders, and surreal monsters while wandering through an old English estate in *Castle Master*, an action/adventure game from Incentive Software (Zephyr One, Calleva Park, Aldermaston, Berkshire, England RG7 4QW, 0734 817288). *RS# 513.*

Only your quest for peace and your courage will accompany you as you travel to a far away kingdom. Freeing its subjects from an evil power is your goal in *Rings of the Medusa* ($49.95). This strategy adventure challenges you to trade, gamble, gain wisdom, and conduct raids in order to fill the army's coffers so it can do battle against the nefarious Medusa.

On a lighter note, Beppo the Clown needs your help locating a country full of priceless crystal. Enemies, surprises, riddles, and 3-D antics await you with *Clown-O-Mania* ($34.95).

With *Table Tennis Simulation* ($34.95) you can play singles or doubles either alone or with a group—who knows; you might take the World Championship! Volley your questions regarding Medusa, Beppo, and Table Tennis to StarGames (708 W. Buffalo Ave., Suite 200, Tampa, FL 33603). *RS# 516.* ■

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Circle 148 on Reader Service card.

HORS D'OEUVRES

Hints, tips and techniques from your fellow Amiga users.

Compiled by Tim Walsh

Easier File Access

IT'S EASIER THAN you may think to make your Amiga's hard-disk drive a little more efficient and user friendly. If you use, say, Electronic Arts' DeluxePaint III regularly, why not make it easy to invoke from the CLI with a minimal number of keystrokes.

Just save a copy of the DeluxePaint III program to the C directory in your hard disk's work partition. Next, rename the program "DP" to minimize keystrokes. Then set the S protect bit to the On mode by entering the following command from the CLI or Shell:

```
Protect DP +s
```

Activating DeluxePaint III is now as easy as typing DP from the CLI or Shell, regardless of the current directory. Naturally, this process can be applied to your word processor and other frequently used utilities and applications.

Alan Stanley
Prince Edward Island, Canada

Personalized RAM Disk Icon

CREATING A MORE attractive RAM disk icon to replace the default icon is a relatively easy process. Using your favorite icon editor, load a Disk icon from a Workbench disk or other suitable source. Once you've edited the icon to your liking, save it to a copy of your Workbench disk, using a "RAM.info" filename. It's important not to save it with a filename of Disk.info, or else it will replace the existing Workbench disk icon.

Next, add the following commands to the startup-sequence on a copy of your Workbench disk:

```
c:Copy RAM.info ram:Disk.info
c:LoadWB > nil:
```

For a system with an autobooting hard-disk drive, follow the above procedure using a copy of your autobooting Workbench on floppy disk. Once you have it working properly, copy the RAM.info and revamped startup-sequence to your hard-disk drive's autoboot partition.

Mark Klapheke
Fort Wayne, IN

How It Stacks Up

KNOWING HOW TO adjust your Amiga's stack area can be a sure cure for many of your multitasking woes. Frequently, attempting to load a large application program, such as Precision Software's Superbase Professional, using the CLI or Shell instead of the Workbench will result in an Insufficient Stack Space message to appear. That's because it requires a stack size of 8000 bytes to run. (You can find this program information by selecting Info from the Workbench menu.) Trying to launch some lesser applications from the CLI using too small a stack causes the computer to crash and a Guru message to appear.

Rather than continually resorting to the Workbench to run such programs, try adjusting the CLI's stack size. To find out the current stack size, enter the following from the CLI or Shell:

```
Stack
```

The size of the current stack will be reported. To increase the stack size to 16K, enter the following from the CLI or Shell:

```
Stack 16000
```

Occasionally, a program may crash the computer even after you have adjusted the stack size. If that's the case, you probably have some other problem besides the size of the stack.

Steve Matsumoto
Houston, TX

Autobooting with RAD

IF YOU HAVE an autobooting hard disk, you may have problems using the AmigaDOS 1.3 RAD (recoverable RAM disk). When a RAD is active, resetting the computer may result in the RAD rebooting, while the autobooting hard-disk drive usually doesn't reboot.

Fortunately, there is a solution short of powering down the computer. Just add the following line to the RAD: description in your mountlist:

```
BOOTPRI = -129
```

Afterwards, whenever you perform a warm reboot, the hard disk will reboot along with the RAD.

Thomas J. Christopher
New Haven, CT

If you have an idea you'd like to share with our readers, send it to Hors d'oeuvres, Amiga-World *Editorial, 80 Elm St., Peterborough, NH 03458. If your idea gets published, you'll receive an* AmigaWorld *surprise gift.* ■

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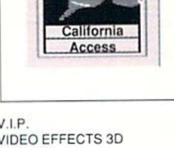
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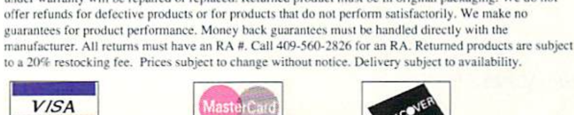
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HELP KEY

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By Louis R. Wallace

NOT MY TYPE

Q: *Why can't I copy an entire disk to the RAD: disk device? I changed HighCyc to equal 79 in my mountlist, and I have plenty of RAM. If I drag a disk icon over to the RAD: icon I get the message "Disks are of incompatible type and cannot be copied." If I use DISKCOPY from the Shell, the RAD: icon disappears from the Workbench. When I then try to access RAD: I get the message "It's not a DOS disk."*

D. Bush
Knoxville, TN

A: I get the same results if I attempt to use Workbench to copy a disk onto the RAD: (recoverable RAM disk) drive. But I can use the Shell or CLI to invoke the DISKCOPY command and copy from a floppy to the RAD: drive, with the following syntax:

```
DISKCOPY DF0: to RAD:
```

As long as the RAD: drive is the proper size (matching the size of the standard floppy disk) it works fine. When it is done, the old RAD: disk is replaced with a copy of whatever disk was in DF0:, icon and all. If your mountlist entry for RAD: is properly defined, it should work. Check your mountlist and make sure the RAD: entry is correct.

If you have the memory to spare, the recoverable RAM disk is a great addition to your working environment. Unlike the normal RAM: disk, once the RAD: drive has been formatted it's contents will survive a warm reboot (pressing CTRL-RIGHT-AMIGA-LEFT-AMIGA). To use the RAD: drive, insert the command MOUNT RAD: in your startup-sequence, and, using a text editor, add the following lines to your mountlist (on a copy of your boot disk):

```
RAD:  Device=ramdrive.device
      Unit=0
      Flags=0
      Surfaces=2
      BlocksPerTrack=11
      Reserved=2
      Interleave=0
      LowCyl=0 ; HighCyl=79
      Buffers=5
      BufMemType=1
      #
```

(Notice that I defined RAD: to have exactly the same number of cylinders as a floppy, resulting in an 880K capacity.)

The next time you reboot, the system will define a RAD: device. Like any disk, it must be formatted before it can be used (you must format RAD: once each time you turn on the Amiga). In the Shell, type (on one line):

```
SYS:SYSTEM/FORMAT DRIVE RAD:
  NAME DISKNAME
```

The RAD: disk will be formatted quickly. After that you can copy files or directories (or copy whole disks using DISKCOPY) to the RAD: device.

If for some reason your system is reset before you can copy the contents of the RAD: disk to more permanent storage, the contents should reappear when the MOUNT RAD: command is issued. Unless the RAM has been corrupted, everything will be intact. Remember there is no need to reformat the RAD: disk when you reboot; just remounting it should be sufficient.

TWISTER

Q: *I am teaching myself programming by writing a game in Amiga Basic, but I can't seem to make animated objects rotate and change size. For example, I want the object to always be pointing forward, even when it turns. When it moves toward or away from you it should get larger or smaller. I am using sprites created with the standard object editor and then converting them to data statements. I have read many books on animation in Amiga Basic but none have addressed this subject. Is it possible?*

S. Buccella
Pt. Washington, NY

A: Yes, you can give your animated objects the illusion of getting larger in the foreground or smaller as you recede into the background, as well as making them appear pointing in any direction. I am sure you have seen Amiga animations (created with powerful and expensive commercial software) that have objects that appear solid and three dimensional. Amiga Basic, however, does not have those kinds of features, and would be far too slow for a real-time activity like a game even if you wrote 3-D object functions for it. To get that kind of action in an Amiga Basic game will require you to do a lot of the work yourself, because the computer considers the animated sprites as flat, one-dimensional data.

The trick is to create several different versions of each object, some smaller and some larger than the default size. The only limits to this approach is that it takes a lot of memory to store multiple sprite or object definitions. When you want them to appear to be moving away, change the shape to smaller and smaller versions; to make it appear to grow, change to larger and larger sprites. The same technique applies for making the sprite appear to turn. Draw a different sprite for every position, then change the images to make it appear the sprite is turning. To make the change, use the command (on one line):

```
OBJECT.SHAPE OBJECT id1,
  OBJECT id2
```

This will change the shape of object id1 into whatever object id2 was. By making successive shape changes, you can create the illusion of continuous change. Here's an example that would change shape 1 into 24 other shapes.

```
FOR I=2 TO 25
  OBJECT.SHAPE 1,I
NEXT I
```

■

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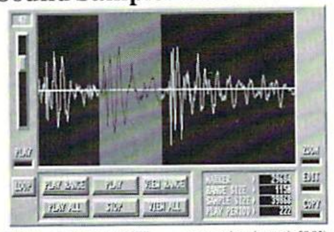
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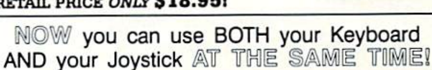
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LAST LICKS

Readers Speak

Question of the Month: "If you were elected president of Commodore, what would be the first thing you would do?"

"Commodore is already starting to do what I would do. I would try for heavy penetration of the Amiga into the commercial world."

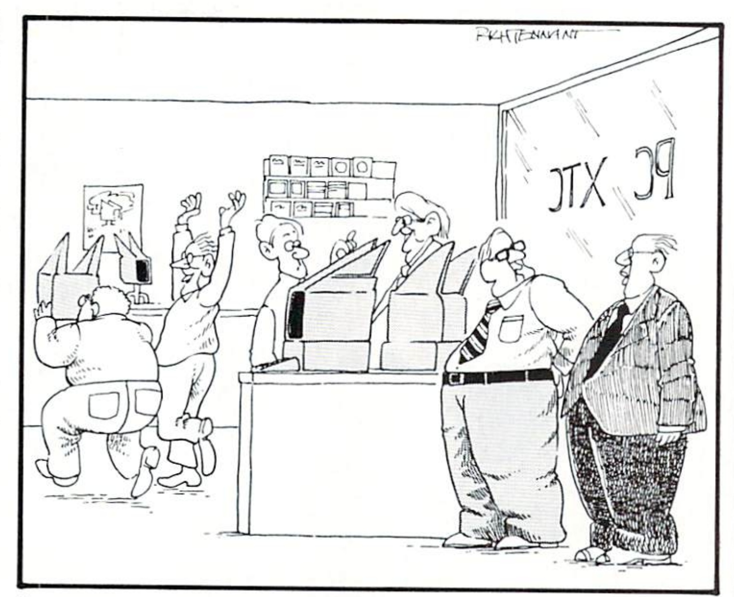
Dave Spitler
Louisville, KY

"I would get rid of that terrible hyped-up advertising campaign and replace it with a better one."

Anonymous
Santa Anna, CA

"I would increase the advertising of the Amiga and point out characteristics that are different from other PCs like IBM and Apple. . .I would push the Amiga. They (Commodore) have been doing that this Christmas so I've bought stock in Commodore."

Harold E. Ratcliffe
Bethesda, MD



"WELL, WE TOOK A POLL AND FOUND THAT WHAT PEOPLE REALLY WANTED WASN'T MORE POWER OR INCREASED APPLICATIONS, BUT JUST REALLY NEAT TAIL FINS."

Ear to the Wall

Yikes: According to the popular television show *The Computer Chronicles*, the new Macintosh operating system (System 7.0) will take up 3MB of RAM and still will not multitask. That is because individual bit mapped, graphics-intensive applications already tax its single 68000 family processor. Sounds like Apple needs a few custom coprocessors if they want to do more than one thing at once.

Toaster, Toaster, Where's My Toaster?: NewTek is still working out bugs in the Toaster software, and now plans a Spring kickoff. Look for underground celebs Penn & Teller to be involved in a special Toaster video project. We may even get a cameo appearance by Dana Carvey (Saturday Night Live's Church Lady), since Dana's more technically astute brother Brad is a key member of the Toaster team.

Hats Off!: A quick thanks to two of our competitors, *Amazing* and *Info*, for helping us to publicize the Amiga Developers Association. We may have started it, but this association is open to all in the Amiga market, and it will hopefully help all in the Amiga market. Thanks for good words.

Enough Already: Last month's issue mentioned the name Mike Halverson, and spelled it the same way it was spelled in the previous month's editorial. We have been talking about Mike because he is a colorful guy, thought up the idea of the Amiga Developers Association, and is doing some wild stuff in the area of voice recognition. But we have also been consistently misspelling his name. According to our sources, it is spelled HALVORSON!

OUCH!: *Amiga-Welt* is not what you get when your computer falls on your leg. It is the German edition of *AmigaWorld*. Now that East Germany (which is beginning to earn its formal name, German Democratic Republic) has opened up the Berlin Wall, *Amiga-Welt* is stepping over. *Amiga-Welt* will be distributed through Die Wirtschaft, an East German publishing company.

New Kid in Town: Preferred Technologies Inc. recently scooped two employees from Southern, a major Amiga Software distributor now under new ownership.

Unlike Southern, which focused on software distribution, Preferred is more of a developer/publisher. It recently acquired the rights to M2Sprint, a Modula-2 Compiler/Debugger, and has developed Spectrum, a product aimed at Digi-View that has yet to ship. The firm is also planning launches of hard drives, mice, MIDI, and sound sampling products. *—**Doug Barney***

So What?!?

It is funny to sit behind an Amiga and watch the rest of the PC and workstation industry get all excited about Unix. For those in the dark, Unix is a 20-year old operating system that consumes every ounce of computing power tossed at it. In fact, it seems that there have been more articles about Unix lately than there are users.

Unix is hot because OS/2 from IBM and Microsoft is not. Unix, according to its backers, has it all: multitasking, large amounts of addressable RAM, graphical user interfaces, and applications. OS/2, meanwhile, has the first three items nailed down, but fails miserably on the last.

Unix and OS/2 backers make these features sound awfully new. But to Amigans, they are awful familiar. The Amiga operating system has all of the above attributes, and runs in a very tight memory space. It is just that nobody seems to care. Why multitask on a $2000 system when you can buy a $25,000 workstation to do the same thing with Unix?

Soon enough, users will be able to compare the Amiga native operating system with Unix. That is because they will both be running on the same machine!

For many applications, the Amiga's native mode will be clearly superior.

But for others, Unix will shine. That is because some super high-end applications have been written exclusively for Unix, and some devices such as super-hi-res graphics boards have been designed to work with it. And with a Bridgeboard, you should also be able to run OS/2, if you've a mind to. The Amiga doesn't sound so proprietary or so bad after all.

—Doug Barney

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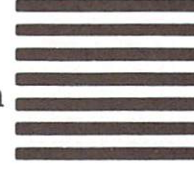


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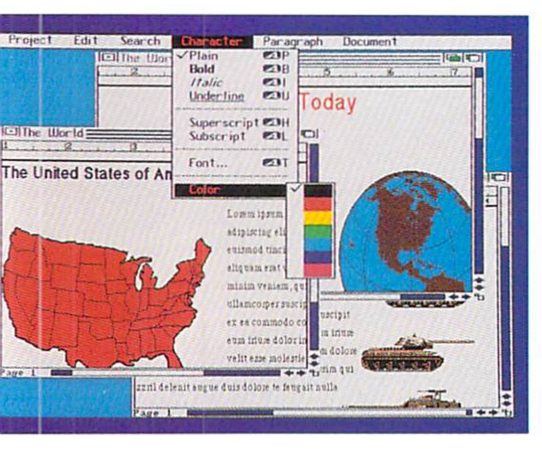
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Just The Facts:

What Makes Digi-Paint 3 the Ultimate Paint Program?

"Finding the best paint program for your Amiga can be confusing, but once you have the facts it's simple."

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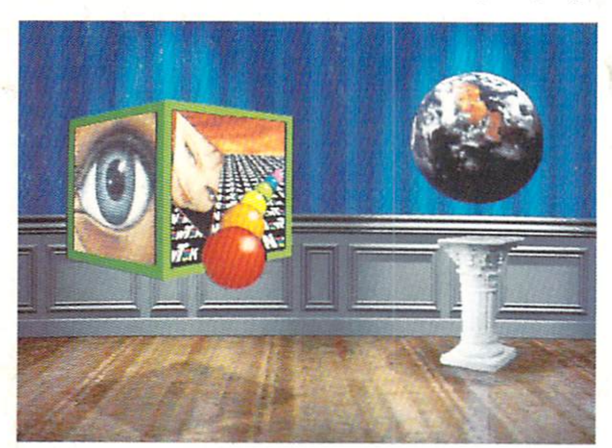
"Why is Digi-Paint 3 better than DeluxePaint III™?"

Digi-Paint 3 works in the Amiga's powerful Hold And Modify (HAM) mode, which allows you to paint using all 4096 colors simultaneously. By comparison, Deluxe Paint III (by Electronic Arts) operates in less sophisticated modes, restricting you to a maximum of only 64 colors. Advanced features available in Digi-Paint 3 – including Colorizing, Variable Transparency, Shading, Lighten, Darken and Range Painting – are simply not possible in Deluxe Paint III due to its 64 color limitation. AMIGAWORLD warns, "Competitors may want to head back to the drawing board, because Digi-Paint 3 is hard to beat!"

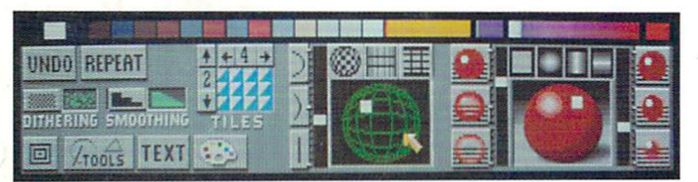
"What makes Digi-Paint 3 better than other HAM paint programs?"

Digi-Paint 3 is the only Amiga paint program written in 100% assembly language. Although challenging to program (taking up to 10 times longer than other computer languages), it's the only way to achieve the incredible speed found in Digi-Paint 3. AMIGAWORLD calls it "the fastest HAM paint program yet" and AMIGA SENTRY estimates it's, "6-10 times faster" than the nearest contender.

Other advanced features found *only* in Digi-Paint 3 include: anti-aliased texture mapping, anti-aliased fonts, ARexx support, 1024 x 1024 super bitmaps with auto-scrolling and dithering to 30 bits per pixel (over a billion colors internally, giving you tens of thousands of apparent colors). COMPUTER SHOPPER magazine reports "Digi-Paint 3 is without a doubt the most advanced HAM paint program to date!"



See us at the AmiEXPO in Washington, DC March 16–18



"But is Digi-Paint 3 easy to use?"

I've learned that no matter how powerful a program is, if it's not friendly it's not worth my time. We designed Digi-Paint 3 with all users in mind – from the beginner just starting out with computers, to the "power user" who demands the most advanced features possible. The spiral-bound manual contains a step-by-step Guided Tour, 11 hands-on tutorials, a color coded reference card, and almost one hundred example photos.

Digi-Paint 3's intuitive user interface was created by Digi-View designer (and NewTek Founder) Tim Jenison and renowned Amiga artist Jim Sachs. It features innovative "Dashboard" controls which AMIGAWORLD regards as "a joy to use" and "very easy to learn and understand". INFO MAGAZINE says the new interface "looks great and works logically".





"What is the Transfer 24 program included with Digi-Paint 3?"

Transfer 24 is a separate program disk included in the Digi-Paint 3 package, allowing you to alter any picture's brightness, color saturation, contrast, hue and sharpness, almost as easily as adjusting the controls on your television set. Transfer 24 also lets you modify the size, palette, and resolution of any picture. These powerful features, known as "Image Processing", give you incredible control over your final artwork. You can also save your image in any of the Amiga's 24 resolution modes (up to 768x480) making it compatible with all Amiga graphics software. AX MAGAZINE notes that "Transfer 24 gives you even more options as to the final appearance of your work". AMIGAWORLD declares, "Transfer 24 is great for making overall changes."

"What technical support does NewTek offer?"

Digi-Paint 3 has one other thing you won't find in any ordinary paint program: a toll-free help line. If you should have any questions while using Digi-Paint 3, you're not on your own. Call NewTek's technical support team at 1-800-736-7617 Monday through Friday, 8 am -7 pm Central Time.

Digi-Paint 3 is available now at your local Amiga dealer or call **1-800-843-8934** or **1-913-354-1146.**

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